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# THE IRON AGE

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# *Steel*

## ACROSS THE GOLDEN GATE

The main span of the Golden Gate Bridge is the longest in the world—4200 feet. Its towers—746 feet high—rank among the ten tallest structures. Each supports a load of 84,000 tons.

**TOWERS AND OTHER  
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# ▲ ▲ ▲ THE IRON AGE ▲ ▲ ▲

MAY 20, 1937

ESTABLISHED 1855

Vol. 139, No. 20

## 25 Determinations on Cast Iron in 25 Minutes

◦ ◦ ◦  
By FRANK J. OLIVER

*Associate Editor, The Iron Age*  
◦ ◦ ◦

**A**FTER almost a year of experimental work, the spectrographic analysis of alloy cast iron and steel has been put on a routine, commercial basis by the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. Through cooperative development work on the

part of photographic plate manufacturers, high-contrast plates are now available that can be developed and fixed rapidly enough to make possible the quantitative determination of 25 elements in as many minutes. This covers the elements present in five to six ladle mixtures.

To make this possible took the practical vision of a foundry executive and the cooperation of a university research laboratory in putting a complex theory into practice. It was Ira A. Wyant, secretary of the Campbell, Wyant & Cannon Foundry Co., who had the vision, and Dr. H. B. Vincent and Prof. R. A. Sawyer, both of the University of Michigan, who performed the commercial development work at Ann Arbor. A. M. Sampson, spectrographic engineer of the foundry, commuted back and forth between shop and campus, lending an engineer's viewpoint on the mechanical details and eventually taking charge of the laboratory installed at Muskegon. The photographs show the apparatus in use there today.

In the spectrographic method, a high-frequency spark is struck be-



**SPECTROGRAPHIC** analysis of metals is not new. It has been used as a qualitative check for years, and as a research laboratory technic it has been known for over a hundred years. Any handbook of physics and chemistry gives tables of wave lengths of various spectra of all the common elements. For iron alone,

there are hundreds of known wave lengths. The method is a regular tool of astronomers in identifying the elements in distant planets. Only in the last year, however, have the chemico-physical phenomena of the variations in intensity of light emitted by incandescent vapors of metallic elements been applied in the ferrous foundry industry as a quantitative measure.

tween two small electrodes of the material being examined and the light emitted therefrom is passed through the slit of a spectrograph. This instrument contains in its optical system a prism that spreads out the band of diffracted light so that it can be photographed as vertical black lines of varying degrees of density. Each element present in the sample has a characteristic line or lines which can readily be identified. The density of these lines varies according to the amount of the element present and the variations can be measured by means of an

centage of silicon, manganese, chromium, nickel, copper and molybdenum. Carbon determinations as yet have to be made by chemical analysis in the usual manner, as do sulphur and phosphorus checks, which are made only in a percentage of the heats. It might be explained that copper-silicon steel brake drums are a regular production run and heats are checked every 15 min. In addition, automotive cylinder blocks and heads, camshafts and cylinder liners, chiefly high alloy material, are regularly poured. Much of the metal is duplexed in the electric

are slipped in a holder that gives the correct spark gap when the electrodes are clipped in the machine, Fig. 2. Experience has shown that a 50-sec. exposure is best suited for the plates used, and is sufficient to give reliable results.

The spectrograph proper, Fig. 3, is a Littrow type, made by Bausch & Lomb Optical Co., of 1820 mm. nominal focal length. The plate holder has been revamped to take a plate 4 x 11½ in. instead of a 10-in. plate as originally designed. Only the light in the ultra-violet range (0.224 to 0.295 microns wave length) is focused on the plate, so that all the optical elements must be quartz. The bilateral slit has a fairly large opening (70 microns) to get a wide enough line to work the densitometer and its galvanometer. Spark and slit are about 4 ft. apart. The plate holder is moveably mounted so as to expose a strip ¼ in. high at a time. In this manner as many as nine spectrographs can be recorded on a single plate, although four to six exposures are more nearly average.

A team of two men operates the equipment. One sets up the electrodes and starts the action, the second is in the adjoining spectrograph room. He times the exposure and cuts the circuits, then shifts the plate for the next shot.

These spectrographic plates may be described as a high-contrast, fine-grain plate. Such a plate is inherently slow, but high exposure speed is not desired in this phase of the process. What is much more essential is the time of processing the plate, which should be reduced to a minimum. According to the batch and make, time of development may vary from 45 sec. to 2½ min.; fixing in hypo, from 1 to 4 min. and the length of wash varies accordingly from 1 to 4 min. In between developing and fixing, there is a 30-sec. rinse in a chrome-alum hardening bath, and it takes only 1-2 min. to dry over an electric heating box with fan assisting in carrying away the vapor. A standard Eastman hydro-quinone developer (Formula D-19) is usually employed, and developing, hardening and fixing trays are all mechanically rocked by the electric motor and crank mechanism shown in Fig. 4. Because of its lack of sensitivity to red, the plate may be loaded and developed under fairly bright red ceiling lights. The plate is rinsed and sponged off with

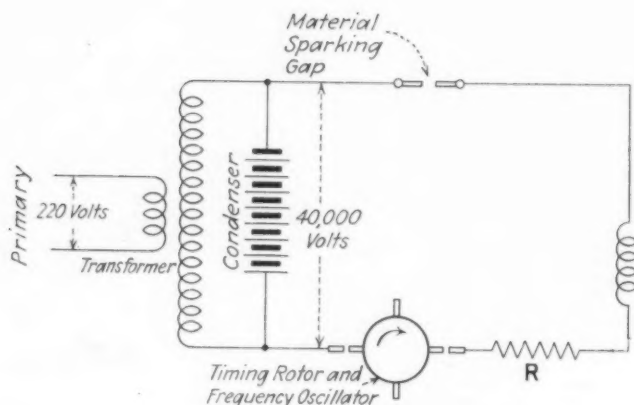


FIG. 1—Electrical circuit of the sparking mechanism. Spark temperature is 10-15,000 deg. C., raising all the elements present in the iron to brilliant incandescent vapors. Only the ultraviolet end of the band is used in making the spectrum analysis.

instrument, known as a densitometer. Through calibration charts and special scales the density can be compared with other rigidly standardized spectrographs and converted directly to percent of the element present. Such calibration charts and scales must first be made up from samples analyzed in the chemical laboratory.

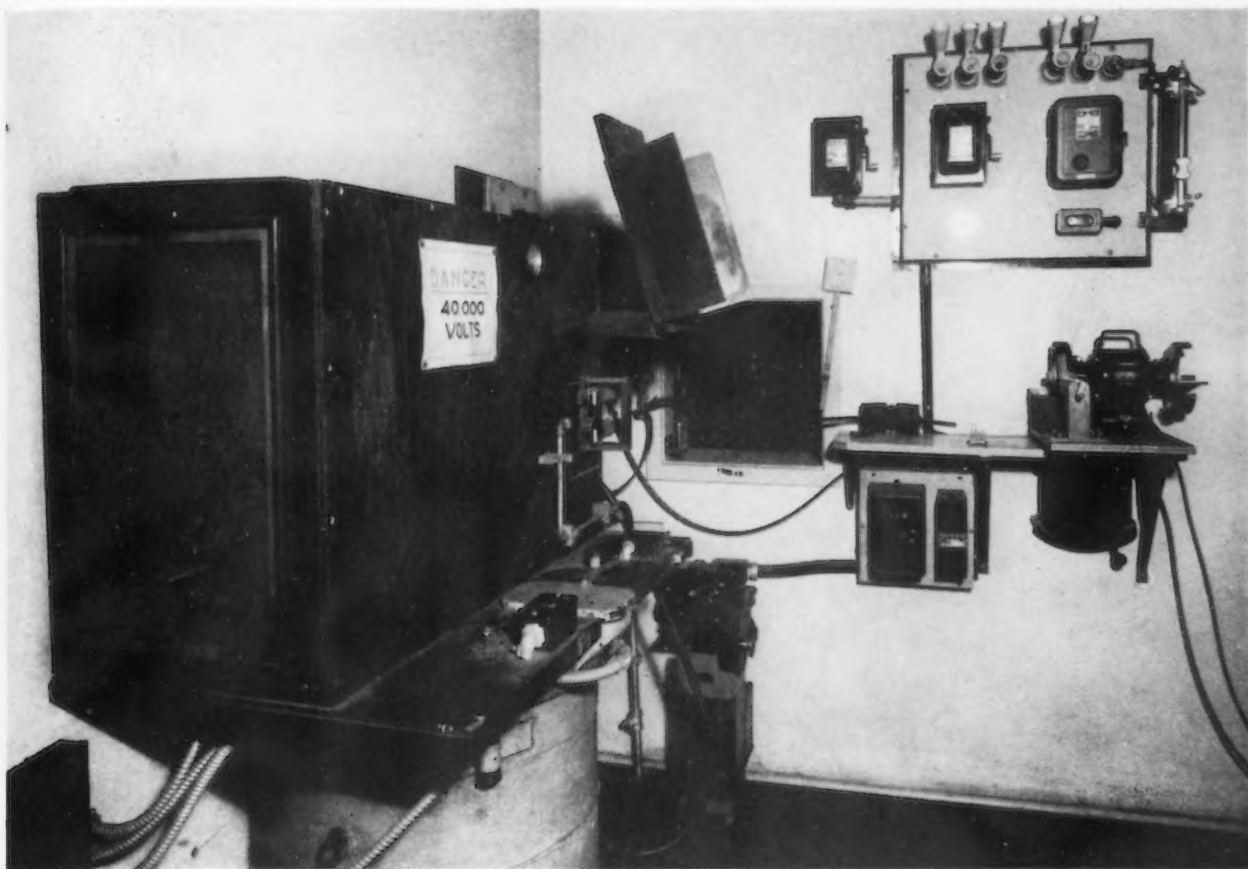
#### Requirements of Laboratory

The requirements of a spectrographic laboratory are therefore: (1) the necessary electrical apparatus for producing the spark; (2) the spectroscope (highest cost unit); (3) photographic darkroom with suitable apparatus; and (4) the densitometer, with calculation table alongside. Altogether, exclusive of the building, the investment in such equipment is approximately \$5000.

The spectrographic technic has its practical limitations. As applied in the Muskegon foundry, it is used for determining the per-

furnace, and the cupola iron is mixed with Bessemer steel to make the drums. Samples of iron are obtained from the transfer ladles after the alloy additions have been made.

The electrical hookup for producing the spark is shown in the chart, Fig. 1. Primary current is at 220 V. and 60 cycles. The oil-immersed transformer steps up the voltage to 40,000 and the 4-pole interrupter (driven by synchronous motor) with suitable condensers produces a discharge oscillation of about 300 kilocycles at the spark gap. About 1½ kw. of energy is consumed. The electrodes are 1 in. long by ⅜ in. in diameter and are cast four at a time in a permanent mold with plenty of metal in the common riser. This mold is hinged for opening and is poured from a small hand ladle used to dip the iron out of the transfer ladles. Fins are trimmed off the electrodes by the same pair of pliers that is used to break them off the riser. Only two out of the four stubs are necessary for electrodes and these



**FIG. 2**—In use, the hinged cover of the spark gap is swung down, closing a safety switch. The slit of the spectrograph may be in the background, together with the electrical controls for the primary circuit.

distilled water so as to leave no mineral deposits that might affect the density. Incidentally, the dryer is a "homemade" affair consisting of some resistance wire, such as is found in a toaster, strung along the bottom of a shallow box, the cover of which is the plate to be dried. An ordinary household fan blows across it and prevents the plate

from scorching, besides hastening evaporation. Using the fastest processing plate available, total elapsed time for darkroom work is 5 to 6 min.

#### Analysis of Spectrum Lines

Analysis of the spectrum lines is made on the densitometer, Fig. 5, in an adjoining room which is

in darkness, except for the tube lamp over the computing table. The same team of men handles this phase of the technic, one reading the densitometer, the other computing and recording. This densitometer is an instrument with a light source that is projected through the plate in a narrow beam. By means of mirrors, the

**FIG. 3**—Charging a plate in the spectrograph. The sparking apparatus is in the next room, and the slit is under the black cloth.



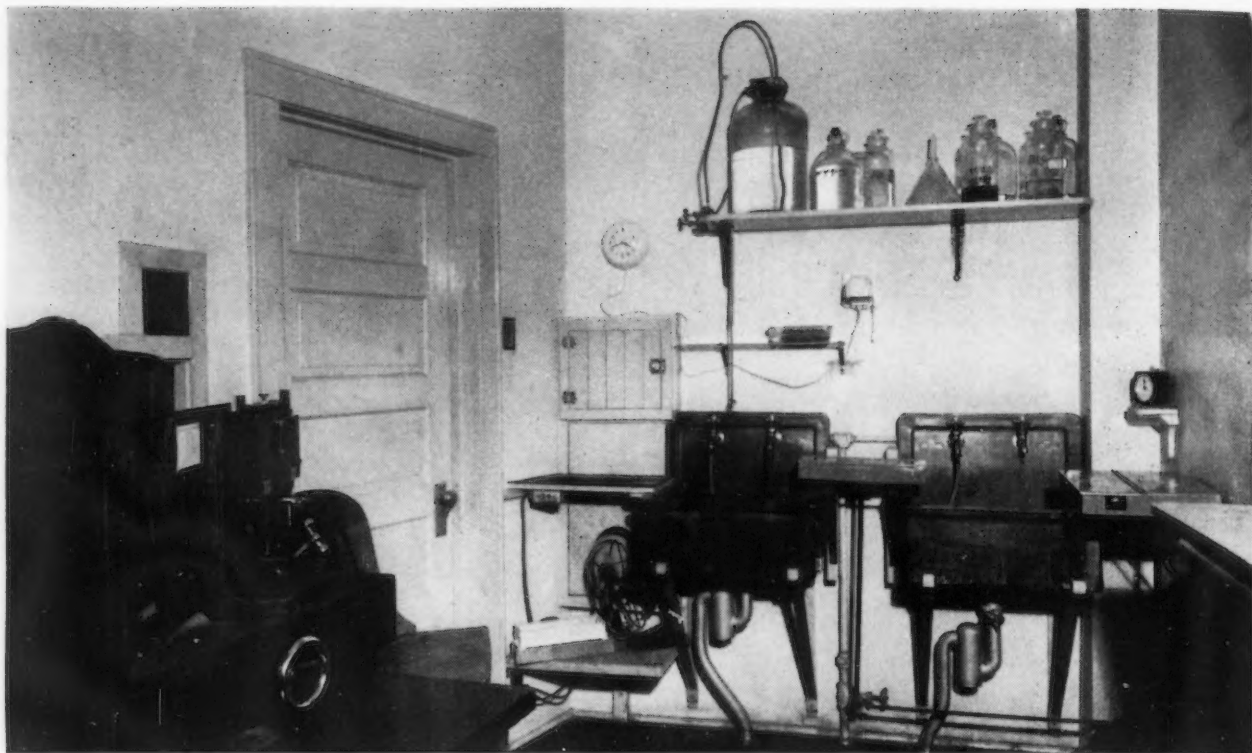


FIG. 4—All processing trays for the development and fixing of the plates are mechanically agitated by the motor and crank mechanism on the floor at the right. The fan is used for drying the plates over heater coils.

light thus screened by the spectrum line is projected on a photoelectric cell which is hooked up to a galvanometer at the far side of the room. From the same light source a small beam is shot out the back side onto the galvanometer mirror and is reflected on a suitable scale in the densitometer proper. This instrument has also been revamped. The frame holding the plate has been rebuilt so as to make the location of the spectrum lines more positive and more accurate. There is an up-and-down movement to bring individual spectrographs into position for analysis and the cross movement has three speeds: a friction slide for fast manual adjustment, a rack movement for rough positioning and a screw for slow motion of a spectrum line across the field of light. The galvanometer damping has been increased to give a period of 2 sec. (rather than 7 sec.). The slow motion gives the galvanometer time to build up to maximum reading. Readings of a particular element are always relative to an adjacent iron line, of which there are many since the latter makes up about 95 per cent of the metal analyzed.

Because of the variation in emulsions and in time of development, every plate must be calibrated before readings on elements can be taken. The densitometer itself also varies due to changes in the light

sources as it ages, dust on the condenser lenses and the like. This calibration is the work of a minute and is done by plotting a typical sensitivity curve. To explain this process, however, it is necessary to refer back to the original calibration of the spectrometer and densitometer by the stepped diaphragm method. This method is covered by patents taken out by Dr. Wolfe and Professor Duffendack at the University of Michigan. In calibrating a plate by the method indicated, light from a carefully controlled lamp is passed through the diaphragm and recorded photographically as a band on the plate. The slit has stepped sections, each of which varies in width in the proportion of 1.5 raised to the 0, 1, 2, 3, 4, 5, etc. power. The figure 1.5 is empirical and was determined by experiment. Thus, the relative slit widths are (1.5°), 1.5, 2.25, 3.38, 5.07, 7.61, etc. By calling 1.5 the base of a logarithmic system, we have as the logs of the

slit widths simply 0, 1, 2, 3, 4, 5, etc. (Def.: The log of a number is the power to which the base must be raised in order to equal that number.) Thus,  $\log_{1.5} 3.38 = 3$ . It was a simple matter to find iron lines in the spectrograph corresponding in depth of shade to the stepped densities produced in the experimental plates by the diaphragm. When the densitometer readings are plotted as ordinates and the log slit widths (exposure) as abscissa, the shape of the curve drawn between the points is practically straight for the main portion with the ends falling off, somewhat like a half loop of a hysteresis curve. This calibration curve is plotted in pencil on millimetric graph papers.

All analytical readings are referred to this curve. To obtain a reading on silicon, for example, the nearest iron spectrum line is first read for maximum galvanometer deflection and the point on the curve corresponding to this reading becomes momentarily the base line for silicon determination. By means of a transparent slider with ruled vertical line, the zero point of a conversion scale is brought in line with this point. The silicon line is then read and the per cent of the element present is read directly from the scale below the slider hair line which has been moved to the point on the calibra-

tion curve corresponding to its densitometer reading. For each element, an empirical scale has been worked out reading directly in per cent. These scales were built up by check through chemical analysis. Once the calibration curve is made the percentages for the various elements can be read off as fast as the densitometer readings can be called off in pairs. Average accuracy of results is within  $\pm 2$  or 3 per cent of the amount present, with an occasional maximum variation of  $\pm 5$  per cent of the amount present.

#### Conditions Held Constant

Conditions throughout must be maintained constant to get reproducible results. A voltage regulator is necessary to keep the primary potential constant on the sparking machine, because there is an electric furnace on the same line melting cold iron and producing a very irregular line load. A compressed air jet is blown across the spark to clear gases as rapidly as they are formed. Furthermore the electrodes are pointed in a small bench grinder to a 5-deg. flat angle, giving a slightly conical shape and tending to center the spark.

Whether a spark or arc should be used is still a debatable question, as was brought out at the Conference on Spectroscopy held last July at the Massachusetts Institute of Technology. Initial use of the arc method proved unsatisfactory at the Campbell, Wyant & Cannon Foundry Co. and the spark method has been much more satisfactory here. Its temperature of 10-15,000 deg. C. raises the atoms

to a high level of excitation and maintains a very uniform condition. For purely qualitative analyses, the low-voltage arc with its 5000-deg. temperature is preferred, since it will show up more elements when present in small amounts.

There is a tremendous saving in time and in apparatus by this method. Allowing for time to let a sample cool in a sand mold and to drill the chips, it requires at least 30 min. to run a silicon determination on a single heat. To determine copper content would require a large amount of plating-out equipment, since these checks are made three to four times an hour. While the silicon is being determined by chemical analysis, an average of five elements in five different samples can be determined quantitatively by the spectrograph, including the copper content.

Carbon content runs in the Campbell, Wyant and Cannon laboratory are made by a fast technic so that the results are available simultaneously with the spectrographic analyses. Under the present set-up it is readily possible to have the analyses of five ladles of different metal back in the melter's hands within a half hour—which is a feat, to say the least.

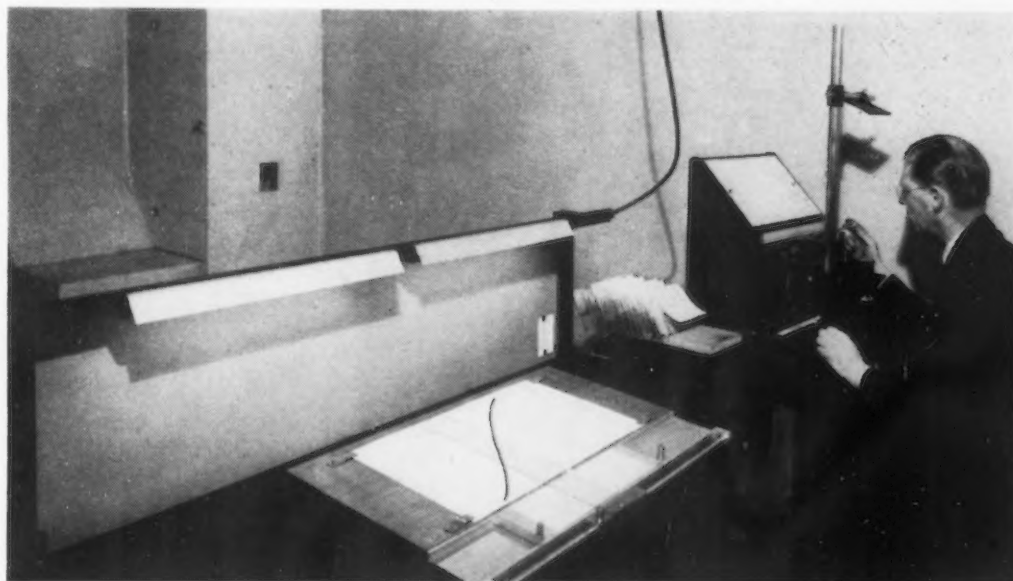
Upon first sight, the technic seems ultra-scientific and out of place in a contract foundry. Yet when reduced to a routine basis, it requires only a normal amount of skill and intelligence. A. M. Sampson, in charge of the laboratory, is no Doctor of Philosophy in physics, but a mechanical engineer who has devoted most of his pro-

fessional life to the design of automotive engines, then spending a year in the spectrographic development work with the research department at the U. of M. One of his laboratory assistants is a recent college graduate, the other is studying nights in the local junior college. High school graduates probably could be trained to do the work, once the experimental features are worked out, as they practically are today.

As to clerical detail, the plates are filed by days of the month in a half-letter size steel file. Wrapped around each plate is a slip of paper giving the order of analysis, identifying the furnace from which each heat was poured, and the product, such as cylinder liners, as well as the sequence of spectrographs on the plate. The time of day is also recorded, as test samples are generally run hourly. The calibration charts are destroyed, since the light source in the densitometer is not a constant, as has been explained. Besides, it is a simple matter to calibrate the plate again if necessary. After three months, the plates are destroyed, but could be stored in boxes if so desired. Electrodes are held only a day, then scrapped. Complete analyses reports are returned to the melters and are filed elsewhere, as well as a running report of analyses of samples from hour to hour.

Thus it is evident that the spectrographic technic is not only wholly practical, but extremely fast. By it a foundry is able to get closer than ever before to that ideal point of knowing what is in the ladle before a mold is poured.

**FIG. 5**—Variations in density in the spectrum lines are measured by a photoelectric cell in this densitometer. The galvanometer shown at the far side of the room is suspended from the ceiling by three piano wires and inverted tripod to eliminate the effect of building vibration. Conversion to per cent of the element present is made by a special slide-rule type of scale shown on the calculating table. This is a recent improvement which has proved a great convenience and time saver.



# BUILDING A FLEET

By LIEUT. M. G. VANGELI, (CC),  
U.S.N.\*



THE large building program of the past few years has been a gigantic task for the materiel bureaus of the Navy. The simultaneous construction of large numbers of warships presented some nice problems in the preparation of and distribution of plans, the procurement of material, inspection of work and the keeping of reasonable peace between the building yards, sub-contractors, financial watchdogs, purveyors of competing

materials, prospective operating personnel, and designers, both professional and amateur.

The conception of a new ship, the detailing of its specifications and its successful construction represent the dovetailing of painstaking efforts on the part of thousands of men representing every trade and every profession, from the ordnance engineer who designs the in-

struments of death to the soul-saving minister who pronounces the benediction at the launching.

In the main, the intricate mechanism of the building program is powered by two Bureaus, Construction and Repair, and Engineering.

\*(The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or Naval Service at large.)



After Congress has supplied authority and money, and previous preliminary steps have been taken, these two Bureaus issue the detailed specifications and contract plans of the new class to be built and invite shipbuilding firms to submit bids based on this information. Contracts are then awarded in accordance with the law. In recent years, Congress has directed that at least half the ships of any class must be built at Navy Yards.

#### How the Plans Are Made

If every building yard had had to prepare its own plans, the sudden and overwhelming demand for draftsmen would have necessitated robbing engineering cradles to supply the required talent. This might have occasioned considerable grief, because competent marine draftsmen become so through long experience and not by designating them as such. The Bureaus themselves could not prepare the necessary working drawings, because their staffs were swamped with the development of major ideas, the drawing of contract plans, general supervision and answering questions. Furthermore, if each yard developed its own plans, sister ships might turn out to be strangers to each other on joining the fleet. Under these circumstances, one of the successful private bidders on each class of ship is designated to prepare tracings of working plans for all the building yards, public and private, concerned with that class of ship. The Superintendent Constructor and Inspector of Machinery at the designing yard collaborate in approving most of the plans, but the most important are sent to the Bureaus for final action. Tracings of approved plans are sent to the other private yards, from which are printed the working drawings.

Navy Yards do not receive their plans direct from the design contractor, because the Government's lowest-bidder system of purchasing often supplies equipment different from that bought by the private contractor. This may require modification of the private plans to suit new dimensions. Furthermore, if the Navy Yards received their plans direct from the contractor and purchased their own material, they would be in competition with each other for delivery and the Treasury would be the loser. Besides, there would be considerable duplication of effort, as it requires little more work to purchase identical equipment for vessels building at several Navy Yards than to purchase only for the vessels building at a single yard. Hence, the plans destined for the Navy Yards pass through a central clearing house called the Central Drafting Office, located in the Brooklyn Navy Yard. Here, material requisitions are prepared, deliveries are scheduled, plans are checked and corrected to suit Government-purchased equipment and tracings of working plans are finally issued to the Government yards. These tracings are not original pen-and-ink drawings, but are reproductions made by a special process from a master copy at the Central Drafting Office.

The great mass of material for Navy-built vessels is purchased by the Bureau of Supplies and Accounts on requisition from the C.D.O. Private yards let their own contracts. But all materials must be in accordance with Federal and Navy specifications. The material bureaus maintain a highly efficient inspection service located at strategic centers in industrial areas all over the country. The Bureaus keep their inspectors informed of material being purchased in their areas. When a purveyor has a shipment

ready, he notifies the local inspector and shipment is not made until the material has been passed. Nearly everything is inspected at the source, but it is subjected to further inspection at the point of receipt. The Bureau of Supplies and Accounts does the buying, but the material bureaus do the accepting.

#### Private Yards Are Supervised

The ships built at private plants are constructed under the watchful eyes of the Superintendent Constructor, representing the Bureau of Construction and Repair; and the Inspector of Machinery, representing the Bureau of Engineering. These two officials are assisted by a group of officer assistants, draftsmen, and technicians who live with the ship and inspect it daily. All work must be satisfactory to the Navy representatives. They, in turn, are guided by the general and detailed specifications, drawings, bureau publications, and common sense based on experience.

So far, everything seems straightforward. But, naturally, it is too perfect to be true. The contract designer establishes a fixed schedule for finishing the plans. Each of the building yards lays its keels at its own particular time, as dictated by working load, facilities, erection schedule and date of delivery. Because there is only one plan schedule, but a variety of working schedules, there is soon much grumbling about lack of drawings. Drafting errors and poor design show up occasionally. It is inevitable. But the lost motion between the designing yards and building yards sometimes delays their correction to an aggravating degree. Zeal for improvements often prompts the Bureaus to authorize changes in plans already is-

(CONTINUED ON PAGE 108)



# Present Trend in Engineering Alloys

° ° °  
By J. A. JONES  
*Manager of Research, United Steel  
Co.'s, Ltd., England*  
° ° °

**A**LTHOUGH chromium steels were among the earliest engineering alloys, the author points out that to nickel steels belong the credit of spreading the gospel of alloy steels in general throughout the industry. With but a passing mention of this early history, the discussion is centered in present-day alloy steels, their

qualities and their uses. Detailed attention is given to the comparative effects of single additions of nickel, vanadium, molybdenum, chromium, tungsten and manganese on the mechanical properties of open-hearth steel. Test data also are given for steels containing two and three alloying elements.

depressed to a low temperature, and thus much lower rates of cooling produce full hardening.

The importance of alloy steels for constructional parts is to be attributed to the fact that they are capable, when subjected to suitable heat treatment, of combining equal or greater ductility with greater strength than carbon steels. Chromium steels were among the earliest alloy steels to be used in connection with engineering construction, but it was from the use of nickel steels for the manufacture of armor plate, guns, etc., that the utility of the typical alloy steels spread through many branches of the industry. Nickel steel of the type under consideration contained about 3.5 per cent of nickel with carbon 0.30 to 0.40 per cent, and this type has remained in continuous use since its introduction.

In the course of normal production, it is generally difficult to secure regularly in carbon steel satisfactory notched-bar impact figures in sections over 2½ in. sq., with a tensile strength of over 40 tons per sq. in. Improved regularity in impact figures can be obtained by the introduction of 0.50, 1.0 or 1.5 per cent of nickel, 1.0 per cent chromium or an additional 1.0 per



**T**HE importance of iron in the field of engineering construction is to be attributed to its capability of alloying in the liquid state with many other elements, and in particular with carbon, which is the essential companion element in steel. Further, iron assumes on heating, a form which dissolves carbon or carbide, and on cooling, changes at some temperature to another form, from which the carbide is again precipitated. The temperature of the transformation, at which this precipitation takes place, is dependent on the rate of cooling. If cooling is sufficiently rapid, precipitation is delayed to such an extent that the

carbide separates in an extremely fine state of division in the iron, while the latter is almost a rigid mass. Such conditions give a hard product. If the rate of cooling be considerably slower, the transformation takes place at a higher temperature, when the iron is in a more mobile condition and the precipitated carbide is afforded an opportunity to coalesce into larger particles, with the result that a soft product is obtained. It is extremely difficult, in plain carbon steels, to depress the transformation temperature sufficiently to yield a fully hardened product. However, by the addition of alloy elements, the transformation temperature can be much more easily

cent of manganese, but even with such additions, thorough permeation of the hardening effect is not obtained in sections larger than 2 in. square when the hardening medium is oil.

The efficiency of the additions of various alloy elements in reducing the effect of mass during quenching may be judged by the relative reduction of the critical cooling velocity of the steel. Table I gives selected results from a list of critical and pre-critical speeds originally published by Eilender and Majert. The pre-critical cooling speed is taken as the *maximum speed which allows the austenite to pearlite change to complete itself*, whereas the critical speed is the *lowest speed which will allow only the austenite to martensite change, with no pearlite present*. It is clear from these results that chromium and manganese respectively are much more effective than nickel in reducing the critical cooling velocity of steel.

The relative efficiency of various alloy elements in reducing the effect of mass during oil-quenching may be further illustrated by the results of Vickers hardness tests taken through the thickness of bars 1½ in. square, in the oil-quenched condition. The analyses of the experimental steels and the results of hardness tests on bars 1½ in. square are shown in Fig. 1. In the case of the manganese and silicon additions as alloy elements, the percentage indicated is additional to that found normally in these steels. In the case of additions amounting to one per cent of alloy element, it will be noted that molybdenum is the most effective, followed closely by manganese and chromium, tungsten and silicon being slightly more effective than nickel. The marked superiority of additions of 2 per cent of manganese or of chromium, compared with 2 per cent of nickel is very evident from the curves.

#### Effect on Mechanical Properties

All of the mechanical properties of 0.40 per cent carbon steel in the oil-hardened and tempered condition are improved as a result of the addition of nickel up to about 6 per cent. No advantage is obtained by increasing the nickel content beyond this limit on account of the limitation imposed on the tempering temperature by the lowering of the  $A_c$  point. With manganese

contents of the order of 0.80 per cent, no advantage is gained by exceeding 4.5 per cent nickel. The improvement in properties is evident in the greater toughness at higher tensile strength compared with carbon steels, as indicated by the results of tests given in Table II.

The presence of small amounts of chromium has a marked effect in modifying the properties of nickel steels from the point of view of improving the mechanical properties and reducing the effect of mass. The effect of small contents of chromium on the surface hardness after oil quenching of 2¼ in. square billets of 3½ per cent nickel steel is shown by the results in Table III.

After oil hardening and tempering, the mechanical properties of

0.40 per cent carbon steels are markedly improved as a result of the presence of chromium up to about 2 per cent, while some further improvement occurs as the chromium content is raised to 3 per cent. Chromium steels show very marked advantages over nickel steels of similar tensile strength in respect to ease of machining. The steels of higher chromium contents are susceptible to temper brittleness if slowly cooled from the tempering temperature.

Chromium steels containing over 1 per cent of chromium have not been developed commercially to any great extent as constructional steels, but steels containing approximately 1 per cent of chromium are in wide demand. Test results representative of 1 per cent chromium steels containing 0.40 per cent carbon are given in Table

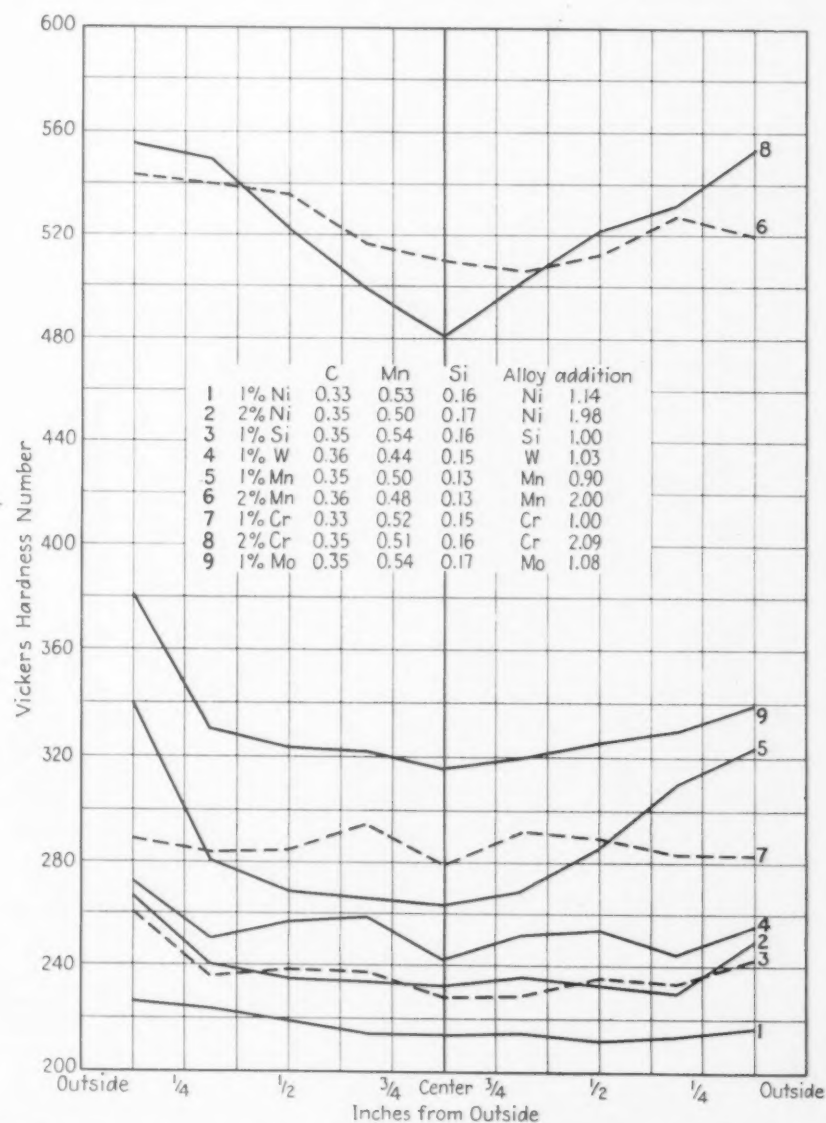


FIG. 1—Effect of various alloy elements on the hardenability of oil-quenched 0.35 per cent carbon steel. These graphs show Vickers hardness values through the thickness of 1½ in. square test bars, oil-quenched from 860 deg. C.

**TABLE I**  
Effect of Alloy Elements on the Pre-Critical and Critical Cooling Speeds of Steel  
Quenching Temperature, 950 Deg. C.

Carbon, Per Cent	Alloying Element, Per Cent	Cooling Speeds	
		Pre-Critical, Deg. Per Sec.	Critical, Deg. Per Sec.
0.42	0.55 Mn	120	550
0.40	1.60 Mn	26	50
0.35	2.20 Mn	2	8
0.42	1.12 Ni	135	450
0.52	3.13 Ni	60	180
0.40	4.80 Ni	22	85
0.55	0.56 Cr	75	400
0.48	1.11 Cr	20	100
0.52	1.96 Cr	11	22
0.38	2.64 Cr	4	10 to 15
0.31	0.48 W	120	650
0.38	1.10 W	60	300
0.35	4.22 W	25 to 30	200
0.35	0.98 Si	220	800
0.41	1.44 Si	190	1,000

**TABLE II**  
Effect of Additions of Nickel on the Mechanical Properties of 0.40 Per Cent Carbon Steel

Section, Inches	Treatment	Maximum Stress, Tons Per Sq. In.	Yield Point, Tons Per Sq. In.	Elonga- tion, Per Cent In 2 In.	Reduc- tion In Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
<b>Carbon Steel (C 0.39, Mn 0.80 per cent):</b>						
1½ Diam.	OH and T at 585 Deg. C.	47.1	32.6	25.0	63	46
	OH and T at 620 Deg. C.	45.3	30.8	26.5	63	66
	OH and T at 650 Deg. C.	44.0	29.2	26.5	66	70
2¼ Sq.	OH and T at 620 Deg. C.	45.0	29.3	25.5	61	31
	OH and T at 650 Deg. C.	44.0	29.0	25.5	63	47
<b>½ Per Cent Nickel Steel (C 0.41, Mn 0.63, Ni 0.51, Cr 0.04):</b>						
1½ Diam.	OH and T at 600 Deg. C.	50.1	35.1	23.0	57	43
	OH and T at 625 Deg. C.	48.0	33.0	24.5	62	45
	OH and T at 650 Deg. C.	47.7	32.3	26.0	62	59
3 Sq.	OH and T at 600 Deg. C.	49.6	32.0	24.0	55	20
	OH and T at 625 Deg. C.	47.0	30.4	25.5	57	26
	OH and T at 650 Deg. C.	45.5	29.3	25.5	59	32
<b>1 Per Cent Nickel Steel (C 0.41, Mn 0.87, Ni 0.86, Cr 0.16):</b>						
1½ Diam.	OH and T at 600 Deg. C.	52.6	40.0	22.5	59	56
	OH and T at 620 Deg. C.	51.0	39.2	23.5	59	75
	OH and T at 650 Deg. C.	49.4	36.7	25.5	62	80
3 Sq.	OH and T at 600 Deg. C.	49.4	32.6	25.0	55	42
	OH and T at 650 Deg. C.	46.2	29.8	27.0	59	52
<b>3 Per Cent Nickel Steel (C 0.42, Mn 0.76, Ni 3.02, Cr 0.09):</b>						
1½ Diam.	OH and T at 600 Deg. C.	60.6	54.7	19.5	57	57
	OH and T at 640 Deg. C.	54.8	47.8	24.5	62	69
3¼ Sq.	OH and T at 600 Deg. C.	53.7	42.4	20.0	52	43
	OH and T at 640 Deg. C.	49.9	38.8	23.0	58	68
<b>3½ Per Cent Nickel Steel (C 0.43, Mn 0.75, Ni 3.38, Cr 0.17):</b>						
1½ Diam.	OH and T at 600 Deg. C.	61.9	55.9	21.0	60	64
	OH and T at 630 Deg. C.	56.7	49.6	23.0	64	75
2½ Diam.	OH and T at 600 Deg. C.	57.8	51.1	20.0	58	58
3¼ Sq.	OH and T at 600 Deg. C.	54.0	44.0	19.0	50	59

**TABLE III**  
Influence of Chromium on Surface Hardness of Nickel Steel

Carbon, Per Cent	Manganese, Per Cent	Nickel, Per Cent	Chromium, Per Cent	Surface Hardness (Brinell)
0.40	0.57	3.40	0.06	316
0.37	0.63	3.34	0.11	387
0.37	0.67	3.25	0.25	460

IV. The properties are thus seen to be of the same order as those of 3 per cent nickel steels for sections up to about 3 in. in diameter.

Unfortunately, chromium steels are particularly susceptible to the development during rolling of surface markings, generally referred to as "chrome lines," the removal of which necessitates the introduction of rough turning in the course of manipulation. In spite of the additional cost thus entailed, chromium steels are still appreciably cheaper than 3 per cent nickel steels. The development of chromium steels containing at least 2 per cent of chromium for constructional purposes would appear to merit consideration.

The presence of manganese up to about 2 per cent has a markedly beneficial effect on the mechanical properties of oil-hardened and tempered 0.40 carbon steel, while the improvement is still maintained with 2.8 per cent of manganese, although this higher content shows no particular advantage and may introduce difficulties in forging and rolling. Representative results of mechanical tests on a number of open-hearth steels containing 1.4 to 1.7 per cent manganese are given in Table V. The mechanical properties of 1.5 per cent manganese steel may be regarded as superior to those of a steel containing a similar content of nickel, and for sections up to 2½ in. diameter are not greatly inferior to those of 3 per cent nickel steel.

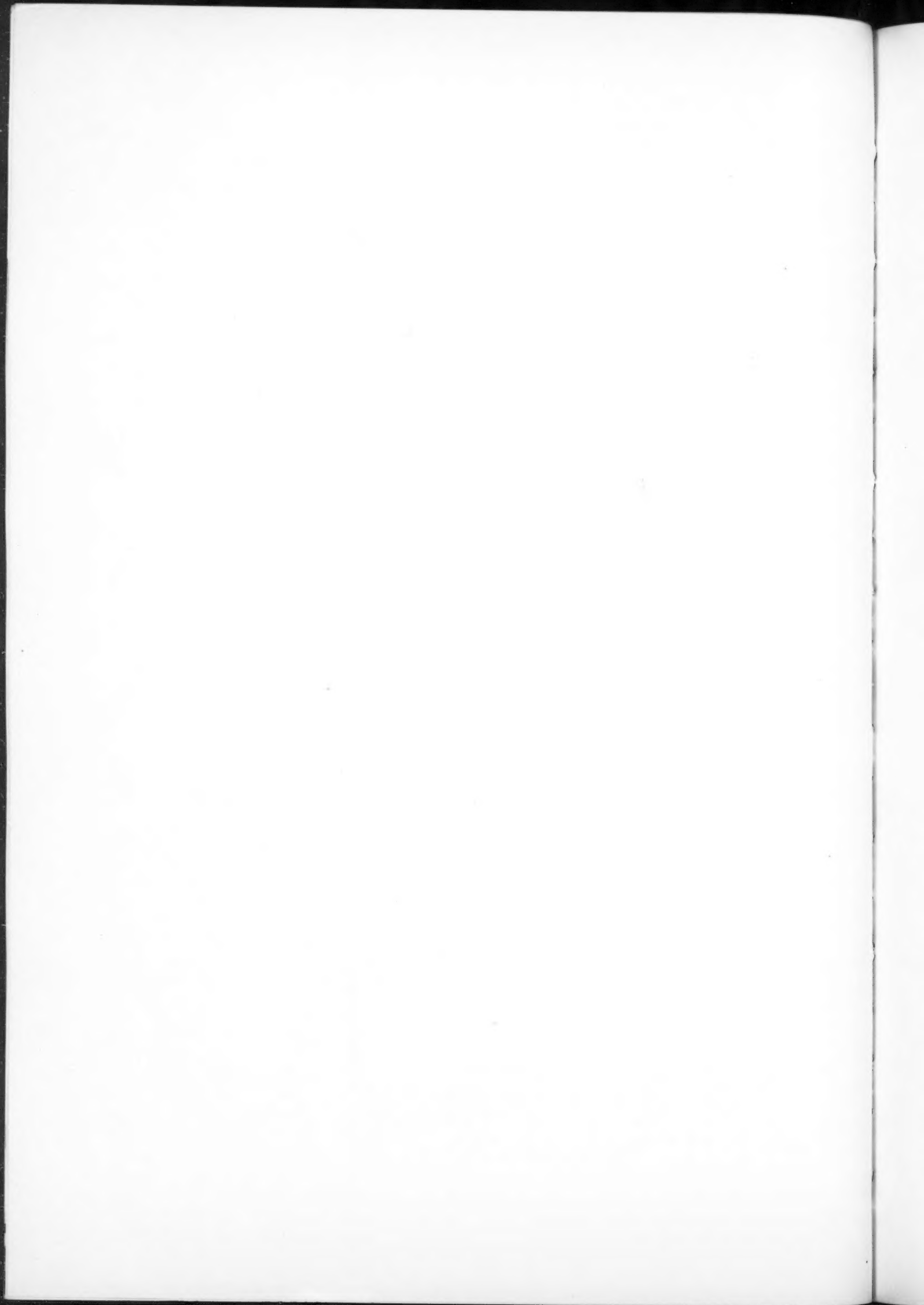
Steels containing 0.30 to 0.40 per cent carbon and low percentages of tungsten have not received any commercial application as constructional steels. Similarly, in the presence of other alloy elements such as nickel and chromium, while tungsten exerts a beneficial effect on the properties of steels of the type used for constructional purposes, its influence is not sufficiently pronounced as to warrant any special recommendation in its favor.

#### Role of Molybdenum and Vanadium

The addition of molybdenum to carbon steels has a marked effect in raising the elastic limit, yield point, maximum stress and notched-bar impact figure, while about 0.60 per cent, the figure for percentage elongation remains relatively high. Molybdenum may be regarded as



R. J. WYSOR, who was recently made president of Republic Steel Corp. Portrait by John Frew for The Iron Age.



an extremely potent alloying element, even small amounts greatly increasing the propensity of steel towards hardening on quenching. This valuable effect is greatly intensified in the presence of other hardening elements, and it is in this field that molybdenum finds its main application.

Vanadium, in the same manner as other alloy elements, exerts a beneficial effect on the properties of heat-treated steels. Plain vanadium steels are used only to a very limited extent for constructional purposes, but chrome-vanadium steels containing about 0.15 per cent vanadium have found a wide field of application for small and medium size sections.

The difficulty of obtaining a direct comparison of the effect of equal additions of single alloy elements on the mechanical properties of open-hearth steel will be readily realised, as many such steels are not commercial steels. Comparative tests can be obtained, however, in small casts of such steels prepared in the laboratory, and some of these results are given in Table VI. These results indicate that for a content of 1 per cent of alloy element, the highest tensile strength after oil-hardening and tempering is obtained in the molybdenum steel. The chromium and the manganese steels are next in order of tensile strength, followed by the tungsten and silicon steels, with the nickel steel showing the lowest values. It would appear therefore that both from the point of view of eliminating the deleterious effect of mass and obtaining optimum mechanical properties, molybdenum is the outstanding alloy element among those examined. Commercially however, considerations of cost militate against the use of simple alloy constructional steels containing molybdenum as high as 1 per cent. Nickel, chromium and medium manganese steels thus constitute the chief classes of simple constructional alloy steels containing single alloy elements which are used in service as constructional steels in the oil-hardened and tempered condition.

It will be evident, however, that the properties obtained from the best of such steels can only satisfy a limited demand. Further improved properties when required in large sections, may be obtained as a result of combining certain proportions of two or more alloy ele-

TABLE IV  
Mechanical Properties of Oil-Hardened and Tempered 1 Per Cent Chromium Steels  
(C 0.40, Mn 0.70, Cr 1.09 Per Cent)

Section, In. Diam.	Treatment	Maximum Stress, Tons Per Sq. In.	Yield Point, Tons Per Sq. In.	Elonga- tion, Per Cent in 2 In.	Reduc- tion In Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
1½	OH and T at 600 Deg. C.	57.8	49.8	22.5	64	67
	OH and T at 650 Deg. C.	55.2	47.0	24.0	64	89
3½	OH and T at 600 Deg. C.	51.6	40.6	21.0	55	44
	OH and T at 650 Deg. C.	47.7	38.4	24.0	59	84

TABLE V  
Effect of the Presence of 1½ Per Cent Manganese on the Mechanical Properties  
of 0.40 Per Cent Carbon Steel

Section, Inches	Treatment	Maximum Stress, Tons per Sq. In.	Yield Point, Tons per Sq. In.	Elonga- tion, Per Cent in 2 In.	Reduc- tion of Area, Per Cent	Average Impact Figure, Ft. Lb.
C 0.36, Mn 1.40 per cent						
1½ diam.	OH and T at 600 deg. C.	47.8	34.6	27.5	66	97
	OH and T at 650 deg. C.	45.3	32.6	28.0	68	106
3 square	OH and T at 600 deg. C.	45.8	31.2	25.5	59	75
	OH and T at 650 deg. C.	43.2	30.0	28.0	66	89
C 0.38, Mn 1.57 per cent						
1½ diam.	OH and T at 600 deg. C.	56.2	46.4	21.5	55	41
	OH and T at 650 deg. C.	50.5	41.1	24.5	62	80
3 square	OH and T at 600 deg. C.	48.1	35.2	25.0	62	72
C 0.38, Mn 1.67 per cent						
1½ diam.	OH and T at 620 deg. C.	55.1	46.6	23.5	62	64
2¾ square	OH and T at 620 deg. C.	48.0	36.0	25.0	62	76

TABLE VI  
Effect of Additions of Alloy Elements on the Mechanical Properties of Oil-Hardened and  
Tempered 0.35 Per Cent Carbon Steel

Experimental Steels (Analyses Given in Fig. 1); 18-Lb. Ingots Forged to ½ In. Diameter  
Bars; Oil-Hardened 860 Deg. C. and Tempered as Indicated

Alloy Addition, Per Cent	Tempering Tempera- ture, Deg. C.	Vickers Hardness Number, As Quenched	Maximum Stress, Tons Per Sq. In.	Yield Point, Tons Per Sq. In.	Elonga- tion Per Cent in 2 In.	Reduc- tion of Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
1 Ni	600	248	43.2	32.3	26.5	63.6	71
	640		42.9	30.6	28.0	66.0	76
2 Ni	600	414	47.4	37.1	25.5	63.6	67
	640		45.8	35.6	27.0	63.6	77
3 Ni	600	536	51.9	47.3	25.0	60.4	63
	640		48.0	42.1	28.0	61.6	73
1 Si	600	348	49.1	35.1	23.5	61.6	65
	640		48.0	34.1	29.0	61.6	73
1 W	600	284	51.8	42.9	23.5	59.2	43
	640		48.5	37.7	25.5	61.6	51
1 Mn	600	511	55.0	46.9	22.5	60.4	59
	640		50.1	42.0	25.0	63.6	63
2 Mn	600	557	58.3	50.9	22.0	54.8	10
	640		54.6	47.1	24.0	59.2	37
1 Cr	600	479	55.0	47.9	20.5	61.6	59
	640		51.8	43.6	23.0	63.6	68
2 Cr	600	571	66.6	60.6	19.0	55.2	15
	640		62.1	56.1	19.5	57.2	47
1 Mo	600	541	82.3	80.5	17.5	52.4	31
	640		63.2	60.8	21.0	59.2	52

\*Additional steel: C 0.35, Mn 0.50, Si 0.16, Ni 3.01 per cent.

TABLE VIII

Susceptibility of Nickel-Chromium Steels to Temper-Brittleness on Air-Cooling From the Tempering Temperature

(Sections 2 1/2 In. Square, Oil-Hardened 820 Deg. C. and Tempered at 610 Deg. C.)

ANALYSES (casts arranged in order of phosphorus content).

Steels	Carbon, Per Cent	Manganese, Per Cent	Sulphur, Per Cent	Phosphorus, Per Cent	Nickel, Per Cent	Chromium, Per Cent
1	0.32	0.63	0.033	0.031	3.32	0.72
2	0.32	0.60	0.042	0.032	3.30	0.77
3	0.32	0.53	0.037	0.033	3.17	0.80
4	0.33	0.60	0.036	0.034	3.07	0.78
5	0.32	0.62	0.041	0.034	3.08	0.73
6	0.31	0.60	0.041	0.034	3.30	0.76
7	0.33	0.59	0.035	0.035	3.63	0.76
8	0.34	0.57	0.042	0.036	3.23	0.72
9	0.34	0.64	0.042	0.038	3.25	0.78
10	0.33	0.62	0.039	0.038	3.20	0.77

## MECHANICAL PROPERTIES

Steel	Cooling Medium	Max. Stress, Tons Per Sq. In.	Yield Point, Tons Per Sq. In.	Elong. Per Cent In 2 In.	Red. of Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
1	Oil	61.5	55.5	22.0	63.6	65
	Air	61.0	55.3	22.5	66.0	64
2	Oil	59.9	54.6	21.5	61.6	71
	Air	59.5	54.6	22.5	63.6	66
3	Oil	61.1	55.0	22.0	59.2	62
	Air	59.8	54.1	22.5	61.6	56
4	Oil	58.9	53.2	21.5	59.2	68
	Air	59.0	53.8	22.5	57.2	66
5	Oil	57.6	51.6	22.5	61.6	69
	Air	57.3	51.6	22.0	61.6	73
6	Oil	60.4	54.4	20.5	57.2	60
	Air	60.0	54.2	20.0	57.2	56
7	Oil	60.4	55.6	20.5	57.2	56
	Air	60.6	56.2	21.5	59.2	36
8	Oil	61.4	56.1	22.0	63.6	56
	Air	61.2	57.0	22.5	63.6	23
9	Oil	63.4	57.6	20.5	61.6	61
	Air	62.7	58.4	21.5	59.2	26
10	Oil	62.1	56.9	21.5	61.6	58
	Air	61.4	57.0	21.5	61.6	25

ments in the steel. The combined effect of two alloy elements such as nickel and chromium, in quenching, is considerably greater than that of either element alone, and consequently sections of larger size can be heat-treated to give high tensile strength and uniformly good properties throughout the mass.

## Two Alloying Elements

Improvement in the properties of the 3.5 per cent nickel steel was sought in the first instance by the addition of chromium. The constructional nickel-chromium steels, like nickel steels, were developed originally for the manufacture of guns, but their applications rapidly widened. The improvement in properties obtained by the addition of 0.75 per cent chromium to 3.5 per cent nickel of the same carbon content is given in Table VII. Unfortunately this type of nickel-chromium steel is normally sus-

ceptible to temper brittleness and for medium-size sections, air-cooling after tempering is not sufficiently rapid to prevent an appreciable drop in impact figure, as indicated by the results obtained from various casts of open-hearth steels, Table VIII.

No experimental work appears to have been carried out at the time, with a view of determining the suitability of the nickel to chromium ratio in 3.5 per cent nickel-chromium steel for the manufacture of a constructional steel to give optimum properties. Steel containing approximately 0.40 per cent carbon, 2.0 per cent nickel and 1.25 per cent chromium was one of the early types to be adopted as an alternative to the steel of higher nickel content. It showed definite advantages. Even if the nickel content be reduced to 1.6 to 1.8 per cent without increasing the chromium content beyond

1.25 per cent, the properties are at least equal to those obtained in 3.0 to 3.5 per cent nickel-chromium steel. This is illustrated by Table IX.

Substitution of part of the nickel in nickel steel by manganese results in a reduction in price with improvement in mechanical properties. The combination of nickel and manganese is particularly effective in reducing the deleterious effect of mass. Two types of steel developed on these lines and in general use analyze as follows: carbon 0.35 to 0.40 per cent, manganese 1.0 to 1.2, nickel 1.0 per cent; and carbon 0.35 to 0.40 per cent, manganese 1.25 per cent and nickel 1.75 per cent. The former type is generally used for meeting specifications calling for 107,000 lb. per sq. in. tensile strength, while the latter type is used for 123,000 lb. per sq. in. The nickel-manganese steels suffer from temper brittleness in the same manner as nickel-chromium steels and this may be overcome in the same way by addition of molybdenum.

Molybdenum on account of its marked effect, particularly in the presence of other alloy elements, in improving the properties of heat-treated steels, has found wide application as an addition to steel and the development of molybdenum-bearing steels has made rapid strides during recent years.

The addition of molybdenum to chromium steels results in marked improvement in mechanical properties, while steels are very easily machineable even when hardened and tempered to high tensile strength. Molybdenum has a marked effect in reducing tendencies towards incomplete hardening during oil-quenching and also in reducing the softening effect of tempering. Steels containing approximately 0.35 per cent carbon, 1.0 per cent chromium and 0.35 per cent molybdenum are admirable substitutes for 3.0 and 3.5 per cent nickel steels, giving similar mechanical properties at slightly reduced cost, but with very definite advantages in possessing a wider tempering range and improved machining properties.

Molybdenum-bearing steels find application in steam service at elevated temperatures where high creep-resistance is required, accompanied by complete immunity from embrittlement due to prolonged exposure at service temper-

atures. It is considered that the full potentialities of the higher chromium-molybdenum steels have not yet been fully developed, but rapid progress is being made in applying the results of research in this field to commercial practice.

Manganese-molybdenum steels have now been in commercial use for a number of years, and must be regarded as established steels with a reputation for reliability. Development is still proceeding along the lines of investigation of the effect of slight modifications in carbon, manganese and molybdenum contents with a view of producing steels with optimum mechanical properties, but already a wide range of analysis is covered by present day commercial manganese-molybdenum steels according to the mechanical properties required. The development of the higher manganese-molybdenum steels has proceeded gradually towards maximum contents of manganese and molybdenum, limitation being placed on the higher limits of manganese by troubles of manipulation and treatment. These difficulties become evident with about 1.7 per cent of manganese when the carbon is of the order of 0.40 per cent, but by suitable adjustment of carbon and manganese, with additions of molybdenum, practically any combination of mechanical properties normally specified can be met.

The air-hardening type of steel warrants mention. At present the nickel-chromium and nickel-chromium-molybdenum steels containing higher nickel than chromium contents hold supremacy. In this field, investigation is still required

Section, Inches	Maximum Stress, Tons per Sq. In.	Yield Point, Tons per Sq. In.	Elongation, Per Cent In 2 In.	Reduction of Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
<b>3½ per cent nickel steel</b>					
1½ diam.	52.9	45.5	24.5	59	60
2¼ diam.	48.0	37.5	26.5	59	75
4½ diam.	48.0	35.1	25.5	55	65
<b>3½ per cent nickel-chromium steel</b>					
1½ diam.	61.6	56.6	21.5	62	60
2¼ diam.	61.1	56.1	21.0	61	58
4½ diam.	54.6	47.9	20.5	58	63

to find the most appropriate nickel to chromium ratio with the view of improving the properties and reducing the cost.

Mention should also be made of the subject of controlled inherent grain size. The tests given are all taken from casts which were not subject during manufacture to any process involving grain size control. Fine inherent grain size improves toughness in carbon and low alloy steels. Experience would indicate that a greater degree of improvement from this point of view may be obtained from the manganese-molybdenum steels than from the higher alloyed steels of the nickel-chromium-molybdenum type.

The major portion of these materials is manufactured by either acid or basic open-hearth processes, both of which are capable of producing large quantities of steel of good quality and the whole of the tests quoted, with one exception, have been carried out on material

produced in the open-hearth furnace. Steel of slightly superior character as regards freedom from non-metallic inclusions is produced in the electric arc furnace, while steel of even greater cleanness with maximum uniformity of quality is produced in the high frequency electric furnace. This latter method of steel manufacture is of recent origin and by its very nature the steel produced must be inherently homogenous and very free from foreign matter. The company with which the author is associated possesses the largest high frequency electric furnace in the world, namely one of five tons capacity. It is possible in this furnace to produce steel of the finest quality, free from contamination, under definite and accurate temperature control, while the well-known movement of the liquid bath ensures complete uniformity of the charge. A further advantage is the conservation of alloying elements to a remarkable degree, the regularity in routine production being outstanding.

TABLE IX  
Comparative Mechanical Properties of ¾ Ni-¾ Cr, and 1½ Ni-1¼ Cr Steel (Open-Hearth Casts, Oil-Hardened and Tempered)

Size, Inches	Analysis, Per Cent				Tempering Temperature, Deg. C.	Position of Test	Maximum Stress, Tons Per Sq. In.	Yield Point, Tons Per Sq. In.	Elong., Per Cent In 2 In.	Red. of Area, Per Cent	Average Izod Impact Figure, Ft. Lb.
	C	Mn	Ni	Cr							
4½ Diam.	0.33	0.57	3.20	0.79	600	O	61.1	42.4	21.0	44	33
						C	59.5	41.2	20.0	42	34
					650	O	52.7	42.6	24.0	66	85
						C	52.1	41.1	23.0	66	76
4½ Diam.	0.38	0.60	1.48	1.16	600	O	53.2	42.2	23.0	64	79
						C	53.3	42.2	22.5	62	76
6 Diam.	0.31	0.55	3.08	0.80	600	O	54.4	46.2	21.5	62	60
						M	53.2	45.0	21.5	59	46
6 Diam.	0.39	0.62	1.62	1.25	610	C	52.2	45.5	21.5	59	56
						O	54.5	44.0	23.0	64	76
						M	54.6	43.4	22.5	63	59
						C	52.8	41.8	23.0	62	49

# The Control and Protection



THERE are two distinct phases to the problem of electrical control in the industrial plant.

One applies specifically to the electrical distribution system, and the other directly to the machines or apparatus operated. Both are tied so closely together, however, that they must be considered in connection with each other. For the purposes of logical discussion the control and protection of the distribution lines will be considered first, in order effectively to establish certain principles common to both matters.

Broadly speaking, industrial electrical control equipment includes:

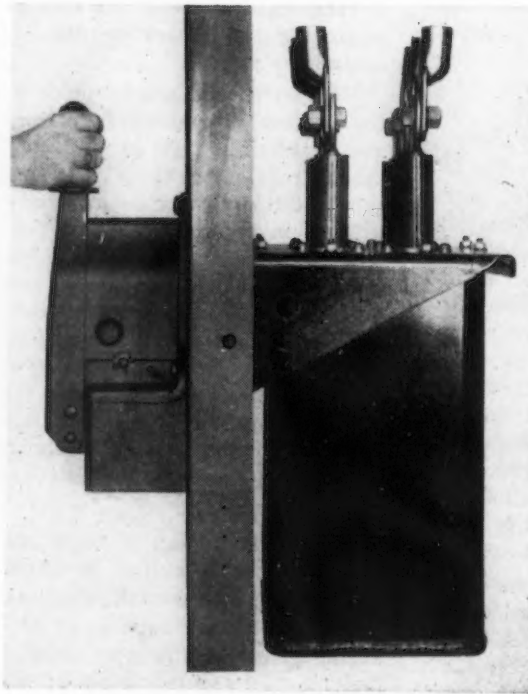
1. Means by which an operator can safely open and close a circuit.
2. Means by which an operator can safely regulate the flow of current.
3. Means by which circuits can safely be opened or closed automatically under certain prescribed conditions.
4. Means by which current, voltage, power, or any other desired value may be maintained, regulated, or varied automatically and with safety.

Note that the first two statements cover *manual* control; that is, control at the will, and by the effort, of a human operator. The last two cover automatic control independently of the human operator, by mechanisms set to do certain jobs when certain prescribed conditions of service are met, or exceeded. These four statements are given in an ascending order of complexity because each succeeding statement involves the use of some of the principles utilized in the preceding statement. Thus explanations may be made in simple and logical order. Likewise it will be simple to consider first the control of the distribution system, then to apply the ideas expressed in describing such control to a consideration of

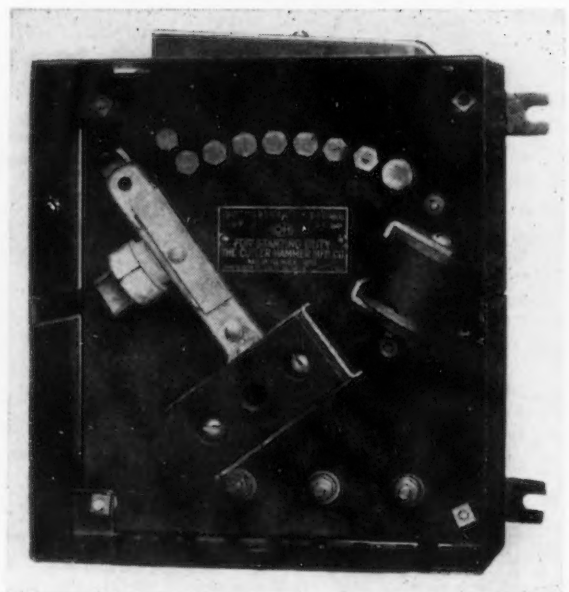
the electrical control of individual machines.

The simplest means of manually opening or closing an electrical

power circuit is the knife switch. Low-powered lines, such as ordinary lighting or alarm circuits, may be operated directly by push-button,



G. E. alternating current oil circuit breaker, closed, mounted on panel. Rated for 2500 volts, 800 amperes. Interrupting rating, 25,000 kva.



CUTLER-HAMMER enclosed standard duty direct current motor starter, with cover and operating handle removed. Compare with typical wiring diagram.

# Of Distribution Lines

By FRANCIS JURASCHEK  
Consulting Editor, *The Iron Age*

snap or tumbler switches, and heavier power lines may be controlled through relays by similar switches operating local low-power

circuits. All these are, however, more complicated mechanisms than the knife switch.

Knife switches may have any

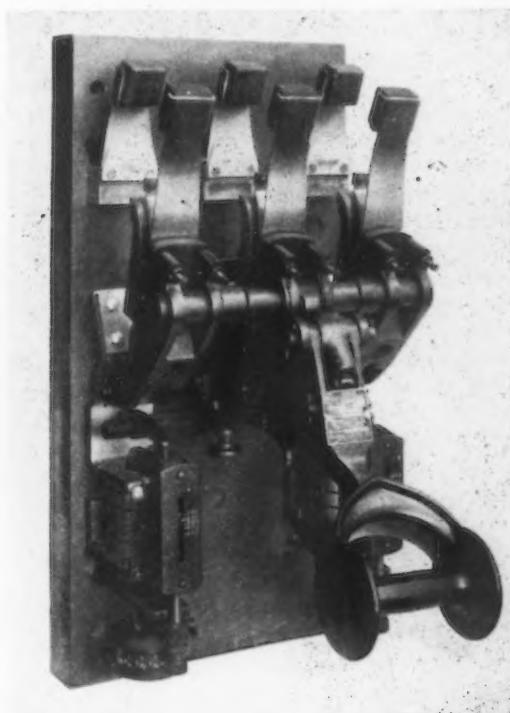
number of "poles" or blades to accommodate the number of lines in the circuit to be opened or closed simultaneously, and may be single or double throw. Single throw knife switches (closing in one direction only) are used to open or close a single circuit. Double throw switches (closing in either of two opposite directions) are used when current is to come from either of two sources or to go to either of two points of application, or where the flow of current is to be reversed.

Knife switches are used for manually opening or closing both direct and alternating current circuits when not more than two switch positions are required. They should not be used alone in the manufacturing plant to interrupt d. c. current at voltages above 250, or a. c. voltages above 500. For higher voltages than these a circuit breaker should be connected in series with the knife switch, or some other means of interrupting the current be employed.

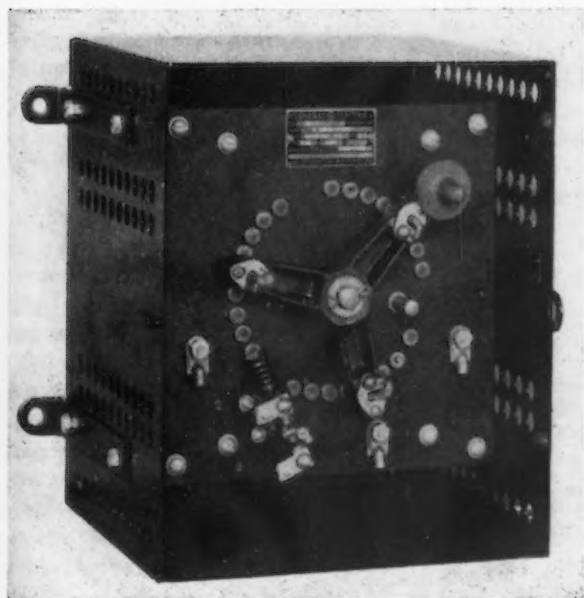
For more than two switch positions, to be used in succession, it is usual to provide drum or dial switches, or contactors. In motor starting, for instance, throwing the full current into the motor windings while the motor is in a state of rest, may result in burning out the motor windings (except in certain types of motors specifically designed for across-the-line starting). A type of starting switch embodying the principles of the rheostat is therefore used, to choke off the full flow of current through heavy resistance at first, then, as the motor gains speed, to cut out more and more of this resistance in successive steps until, at full motor speed, all the resistance is cut out of the circuit and the current flows directly to the motor windings. A rheostat is a type of dial switch.

In a drum switch, contact-fingers mounted on a revolving drum make contact electrically with stationary

G. E. alternating current air circuit breaker, open. Equipped with two inverse time delay devices. Rated for 250 volts, 400 amperes.



G. E. speed regulating slip ring motor rheostat, with auxiliary control switch for interlocking magnetic line switch. Compare with typical wiring diagram.



fingers or plates in successive positions of the drum to open or close various combinations of operating circuits, including those which contain resistances. A familiar example of the use of a drum controller is found on a trolley car. The pair of motors mounted on the truck are first connected in series with heavy resistances included in both motor circuits, then in successive steps the resistances are cut out, the hook-up of the motors changed from series to parallel with the resistances cut back in, and finally the resistances are cut out again. In this final position both motors are operating at full speed and pulling together.

Contact switches have one movable finger contact mounted either on a pivoted lever or a flat spring, coming down straight into contact with a fixed button. The contact is not of the wiping type, as in a rheostat or drum controller, but a meeting type, as in a push button. Contactor switches are generally arranged to be operated by relay circuits which may be actuated either manually by push-button, snap or toggle switches or knife switches, or by automatically operated controls. A familiar example of the operation of a series of contactor switches by a drum controller local circuit is found on the multiple unit electric trains in subways, elevated lines and suburban railroad lines.

Multiple point switches or controllers of all types may be arranged to control various circuits of a power and lighting distribution system, to vary the resistances in both the field and armature windings of motors, to control the flow of current in electric welding or heating apparatus, to vary resistance and apply a brake, or to perform any other suitable combination of operations.

#### Automatic Controls

The simplest automatic control for an electrical circuit is the fuse. Essentially this is a strip of fusible metal contained in a suitable receptacle, bridging a gap in the line. Whenever the current flowing in the line for any reason, exceeds the predetermined limit of safety, the fuse metal burns out, or blows, due to the heating effect of the heavy current passing through it, and the circuit is automatically opened. To close the circuit again it is neces-

sary to insert a fresh fuse in the line-gap. Fuses are generally used only in low-power circuits, such as lighting circuits, and those for small motors. A special type of fuse called a "thermal cut-out" offers protection against the continued flow of small overcurrents which normally would not cause the usual type of fuse to blow, but which might over a period of time, cause damage to the distribution line or the apparatus connected to it.

There are two functions to be served by any automatic current interrupting device. The primary function is, of course, protection. A short circuit in any power distribution system may cause a flow of current through feeder lines up to 50 times the current they were designed to carry, or the drain occasioned by many pieces of apparatus working simultaneously at over-ratings may cause a flow of current far in excess of the feeder capacity. In both cases there is danger of the feeder wires overheating, burning through the insulation, and setting fire to the building, if the current is not interrupted. The second function, however, is almost equally important. It is to exercise discrimination, in order to interrupt the flow of current only when absolutely necessary. Circuit interruptions may occur, when this sort of discrimination cannot be exercised accurately, at such times and so often as to cause serious delays in production.

Excessive current flow in large quantities can always be detected by a fuse. Excessive current flow in small quantities over a considerable period of time may not affect a fuse at all, yet be dangerous. Therefore the thermal cut-out possesses a power of discrimination which the fuse does not have. Both are simple devices, easily replaceable; but on heavy power circuits the expense and annoyances of replacement may be considerable. Consequently fuses and thermal cut-outs generally yield on heavy circuits to a more complicated but permanent piece of equipment called a circuit-breaker.

#### Circuit Breakers

The principle of operation of a circuit-breaker is essentially a combination of the spring knife switch and an electro-magnet. Flow of current exceeding a predetermined

value actuates the magnet causing the switch to trip and open the circuit. Circuit breakers may require manual closing when tripped, or may close automatically through the action of a second electro-magnet when the current becomes normal once more.

Circuit breakers may be designed to exercise a high degree of discrimination. For instance, a line may be designed of such capacity as to enable all the equipment connected to it to operate at double full-load, simultaneously. The circuit-breaker then must be able to carry the requisite amount of current continuously, yet trip if that limit should be exceeded in any respect. If the circuit-breaker itself is not able to make close enough discrimination as to when to open the circuit and when not to, it can always be controlled in turn indirectly through sensitive relay circuits actuated directly by the power lines.

Air circuit-breakers (that is, equipment with the contacts open to the air) are usually of the type requiring manual closing when tripped. Oil circuit-breakers (that is, equipment with the contacts submerged in an enclosing tank filled with oil, to quench the arc) are generally fully automatic, and will close themselves after tripping.

Some circuit-breakers are designed for both manual opening and closing. This may be done by hand, or in the case of larger breakers, by operating control switches which permit the breaker to be opened by a trip coil and closed by a solenoid or a small motor. If the circuit-breaker is intended to protect the system against any faulty condition, however, some means must be provided for automatically opening such a breaker should the fault occur.

Four principal means are employed to do this:

1. Series trip coils connected directly in the main circuit may be used on oil circuit-breakers mounted on a switchboard where the voltage of the current does not exceed 750 volts, or on circuits up to 2300 volts where the breaker is mounted away from the switchboard, entirely within a metal-enclosed structure, and all of these conditions are met; (a) where current transformers can be eliminated, (b) where only instantaneous overcurrent operation is required and, (c)

where it is not necessary to make very accurate discrimination.

2. Tripping may be accomplished from current transformers under conditions similar to (1) above.

3. Tripping may be accomplished by means of relays operating in a d. c. circuit where direct current is

breaker, it shall remain open in spite of all efforts to close it until the short has been removed from the line.

Since a unidirectional current is not easy to quench in oil, and, further, tends to carbonize the oil, air circuit-breakers are used for the

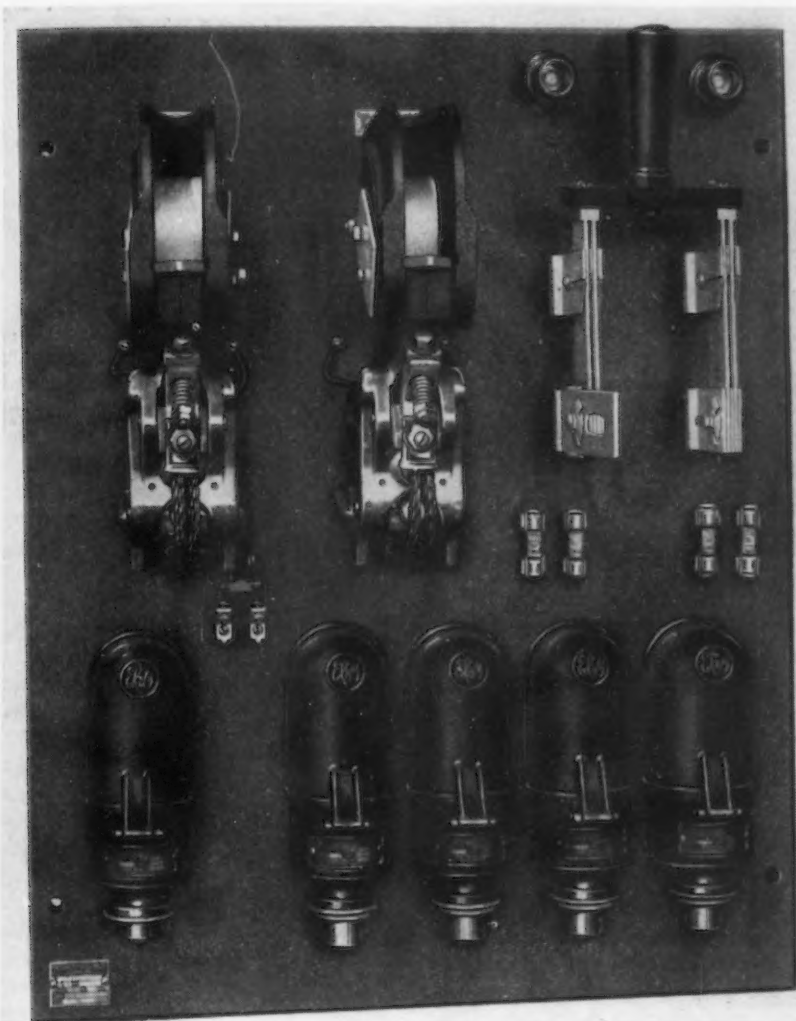
able. Oil circuit-breakers are generally indicated for all other types of circuits not properly protectable by means of fuses or thermal cut-outs.

### Relays

In his book "Electrical Equipment" (recommended to all plant men as a stimulating presentation of the functions of modern electrical apparatus) H. W. Brown has this to say regarding the importance of relays: "When generating stations were small and transmission circuits simple, it was quite satisfactory to protect circuits and apparatus by means of circuit breakers and fuses. The action of both was fairly accurate, and instantaneous except at small overcurrents. At the present time, with increased size of systems, with very much higher voltages, and with the possibilities of much greater damage to the system than heretofore, unaided circuit-breakers are sometimes unsatisfactory, because there is need of much closer discrimination that most breakers can make. For this reason it is worth while to employ relays, which have only one task; namely, to discriminate between those conditions at which the breaker should, and those at which it should not open. . . . Relays have been brought to a state of perfection far beyond what they had a few years ago. The quickness of action and nicety of discrimination entitle many types of present-day relays to the claim of distinctly superhuman performance."

The operation of any relay may be described in general terms, regardless of its construction. On the occurrence of any undesirable condition, the relay mechanism is caused to act automatically, opening or closing one or more contacts in a local, supervisory circuit, which in turn opens or closes a main circuit. For some applications relays are required to act instantaneously, for others, after a definite time period, and for still others, after a definite time period that depends on the abnormality of the current, voltage or other quantity to be controlled. The actuating principle of a relay may be an electro-magnet, a photoelectric cell, or the thermal expansion of a metal or a vapor.

The selectivity of a relay (that is, its power of discrimination between conditions that require or do not require the breaking of a power circuit) is based on two elements—variation in electrical current, and



**E**LECTRIC CONTROLLER & MFG. direct current protective panel, with knife switch, magnetic contactors, overload relays, enclosed fuses and low-voltage protection.

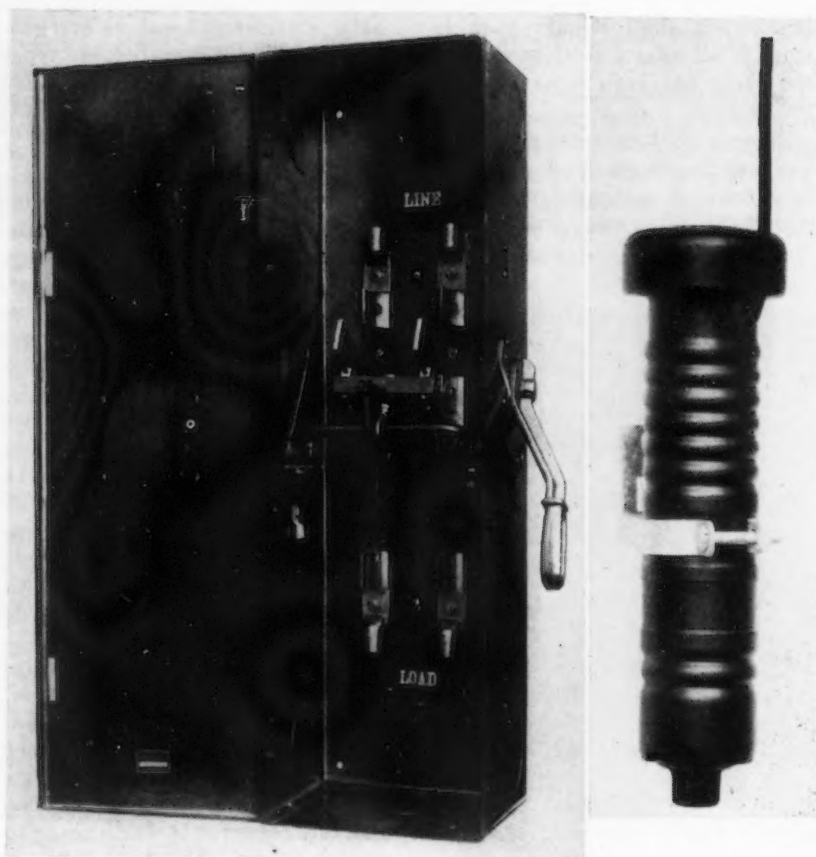
available and very accurate discrimination is required.

4. Where non-automatic manual closing is used, tripping may be accomplished by means of relays or tripping reactors, as well as with current transformers as in (2) above.

It should be noted that in ordinary practice, automatic reclosing is unnecessary. The chief need for automatic closing apparatus is found in automatic switching installations. Whatever the methods of circuit-breaker operation, however, it is essential that, if a short circuit is the fault which opens the

automatic protection of practically all heavy direct currents. Most of them are made to handle 650 volts or less, but they are sometimes used for voltages of 3,000 volts or more. For industrial use the requirements of most air-circuit breakers on a. c. currents will not exceed 600 volts.

Air-break circuit-breakers are used principally (1) for protection of d. c. circuits of 600 amperes or more, (2) for lighter d. c. circuits liable to frequent overcurrents, (3) for d. c. circuits not properly protectable by means of fuses or thermal cut-outs, and (4) for a. c. circuits where oil may be objection-



AT EXTREME LEFT

**C**UTLER-HAMMER standard duty safety switch of the knife type. Double throw, double pole, fusible. Rated for 230 volts, 400 amperes.

o o o

AT LEFT

**T**YPICAL pellet type lightning arrester used for protection of distribution systems. Affords high resistance to passage of low tension currents, but almost no resistance to the passage of high tension line or lightning surges.

time. Relays may be designed to be selective with respect to

- Amount of current
- Sum of or difference between two currents
- Amount of power
- Phase relation of currents
- Ratio of current and voltage
- Time during which an abnormal condition occurs
- Any combination of the above.

Uses for relays on electrical distribution lines include protection against practically any abnormal condition or disturbance that may occur on the lines. For instance, they may be designed to operate in case of a short circuit or a ground in a rotating machine, transformer or feeder line, or when a piece of apparatus becomes too hot, when the current is too large or too small, or when the power supply to a non-reversing machine is reversed. Other reverse current applications occur in electrolytic generating plants (where oxygen produced at the hydrogen end would bring danger of a serious explosion) and in the charging of storage batteries, where under certain circumstances the batteries would discharge through the generator.

Often it is important to maintain constant voltage on feeder lines. A

relay may be used to sound an alarm or to disconnect a circuit when the voltage varies unduly. Other relays may be used to increase or to decrease the amount of power delivered to or from a circuit; for increasing or decreasing the frequency or voltage of a circuit; and under certain circumstances, for regulating the power factor of a circuit. The literature on the design, construction and operation of the hundreds of different relays now available is large, and growing every day. The subject is one of increasing importance, and will be summarized briefly in a later discussion.

#### Lightning Arresters

In addition to automatic protection against short circuits, motor overloads, and other current and voltage disturbances caused within the plant, it is at all times necessary to guard against transient high-voltage phenomena. Transient surges due to lightning (or sometimes caused by switching on high tension lines) may be so severe as to break down the insulation; and after such breakdown, additional damage may be done by the large amount of electrical energy fed into the fault at normal voltage by a generator or transformer.

Lightning may cause two types of line disturbance. The mere presence of an electrically-charged cloud may induce a large build-up of current in a transmission wire. If the cloud passes without a lightning discharge this excess current usually passes off safely into other parts of the system; but if the lightning discharges to the ground or to another cloud fairly near, the readjustment of current in the transmission line is sudden, and at times the power expended in this readjustment is tremendous. The effect on a low-voltage line with relatively poor insulation is likely to be much more serious than on a high-voltage line with correspondingly better insulation. Even though the lightning is miles away and never touches the conductor, there is this induced charge effect, which may provoke serious damage. In the case of a direct lightning hit, of course, the line disturbance will probably be much more serious than is the case with the induced charge.

Aside from lightning disturbances, there may be severe surges due to circuit changes. If a large current is suddenly interrupted by the opening or closing of a circuit breaker, a momentary high voltage is built up which flows throughout the system at nearly the velocity of light. If this high voltage encounters anything to impede its progress, the effect on the circuit at any weak point may be disastrous.

Protection against all these forms of electrical surge may be had in the industrial plant (or immediately outside it) in the form of lightning arresters. There are many

forms of these, and in most modern types they provide a direct path to a ground from the system through a resistor which has the quality of variable resistivity at high and low voltages. For all currents of normal, or slightly above normal voltage, the resistance value is practically infinite, so that it acts as an insulator. At extremely high voltages, however, the resistance value instantly becomes very low, open-

ing a path to the ground for the discharge of the disturbance. Ordinary choke coils, frequently used for this purpose in the past, are actually of little value, and may cause harm in case of a direct lightning hit. Capacitors of adequate size are very satisfactory, but are extremely expensive if designed especially for this purpose. The lightning arresters designed for industrial plant electrical system pro-

tection are the most satisfactory and least expensive of any devices available for the purpose. At the most they are not costly, and should be used in adequate numbers to guarantee complete safety to the distribution line, to the electrical equipment used, to the buildings of the plant, and to the operators.

*(The next article of this series will treat of the Control of Electrically Driven Machinery).*



## Stainless Steel Scrap Flame-Cut Rapidly To Remelting Size

By FRED JUDELSON

*Supervisor, Applied Engineering Department, Philadelphia District, Air Reduction Sales Co.*

UNDESIRABLE accumulation of off-analysis 18-8 steel billets and scrap ends of plates has been effectively eliminated by a Pennsylvania steel company by the use of flame cutting. Formerly this scrap was saw-cut into sizes small enough to permit charging into the melting furnace, but in this, the material had to be first annealed, and even then was very hard on the saw.

With flame cutting, 13 x 13-in. billets are cut into two pieces in 5 min., and with a marked reduction in cost. Oxygen pressure of 90 to 100 lb. and acetylene pressure of about 10 lb., with a size 9, Airco D B style No. 81 tip, are used. A slab 5-in. thick, 30-in. wide has been cut into two pieces in 10 min.,

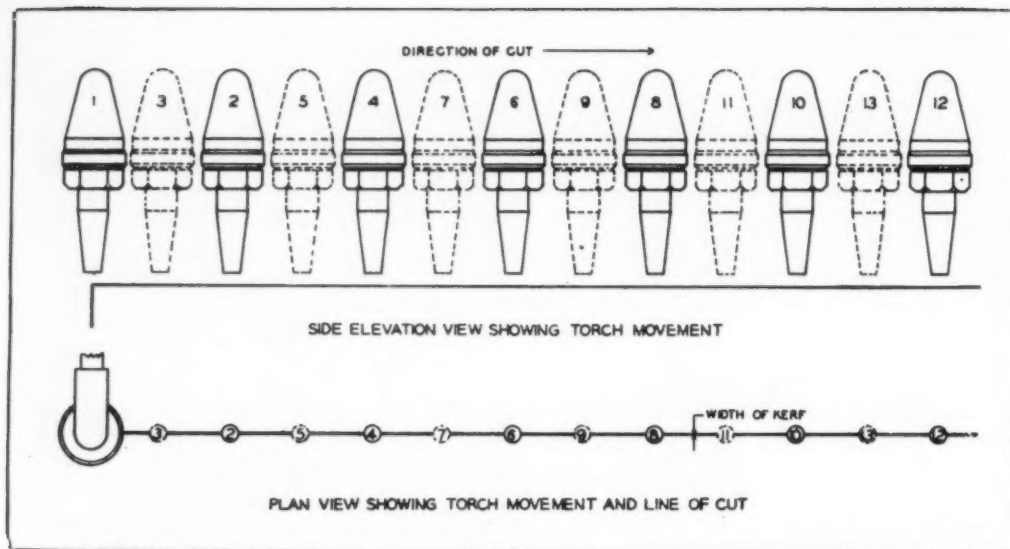
using a No. 6 tip, 75 lb. oxygen and 8 lb. acetylene pressure.

The procedure is not unlike that for cutting of cast iron. A neutral flame seems to give the best results. The trick is in the manipulation of the torch. In cutting cast iron the torch is moved in semi-circles, or half moons, along the line of cut; but in cutting stainless steel the torch is moved back and forth along the line of cut, always in a straight line, as shown in the accompanying diagram.

The numbers on the torches represent the several positions of the torch in sequence of movement. The cut is started at the edge of the material at 1, is moved forward in the direction of cut to position 2, the distance from 1 to

2 being about 1/16 in. This 1/16 in. is about the longest cut that can be made with a single forward thrust of the torch. The torch is then moved backward to position 3, this distance being anywhere from 1/32 to 3/64 in. It is then moved forward again, proceeding to position 4, cutting 1/16 in. metal from position 2 to position 4. In going from position 3 to position 4, the torch moves along the previous cut from position 3 to position 2 and cuts new metal from position 2 to position 4. The torch is then brought backward from 4 to 5, and the operations proceed as before.

The cutting oxygen pressure is left on all the time as the best results seem to be achieved when the movements are made at about



THIS diagram illustrates the cycle of torch movements when cutting stainless steel.

60 cycles per min., actual timing. Thus, the actual cutting action is intermittent. The cutting is much easier after some heat has been gotten into the piece.

On the heavier thicknesses, it is advantageous to heat the front edge of the cut before starting. A flux rod is not necessary. It will be found when cutting the heavier thicknesses that there will

be a drag of about 3 in. at the start of the cut, but this is soon picked up after getting into the piece a short distance. The angle of the tip to the work is exactly the same as when cutting ordinary steel; it is not inclined and then straightened up as when cutting cast iron. The kerf is about  $\frac{1}{2}$ -in. wide.

The procedure outlined above

may be considered as only a beginning. Undoubtedly as the operator gains experience the tip sizes and pressures will be reduced. We started on the theory that a great deal of heat was necessary and lots of oxygen at comparatively medium pressures. For the work herein described an Airco style 3000-A torch,  $\frac{3}{8}$  in. hose, and a style 8490 regulator were used.



44—THE IRON AGE, May 20, 1937

## Bell Metal for Bossy

SPECTACULAR uses of sheet steel in mighty engineering projects are illustrated and discussed so frequently in newspapers and magazines that some of the smaller sheet metal products used in daily life are sometimes overlooked by the public.

C. G. Blum, a sheet metal worker, began making cowbells as a sideline 58 years ago. The Blum Mfg. Co., Collinsville, Ill., is the only factory in the United States devoted exclusively to the manufacture of cowbells. The company, which is now managed by J. H. Blum, Jr., has been taking sheet steel from the Granite City Steel Co., Granite City, Ill., since 1878. When grandfather Blum first began making stock bells, he had to design and build most of the machinery used in their manufacture. Today, with very few changes in design, the same type of machinery is turning out thousands of cowbells.

# Flexible Welder Facilitates Truck Fabrication



THE manufacture of utility trucks for gas, electric and telephone companies for field service has become an important specialized branch of the automotive industry and continuous to show steady growth. With increased output, makers have introduced economies in manufacturing and improved their production methods and the quality of their product. This industry has become quite an important consumer of steel largely in cold-rolled sheets in 16-gage and lighter. Heavier flat rolled steel in 12-gage to  $\frac{3}{8}$ -in. thick is used for the bed.

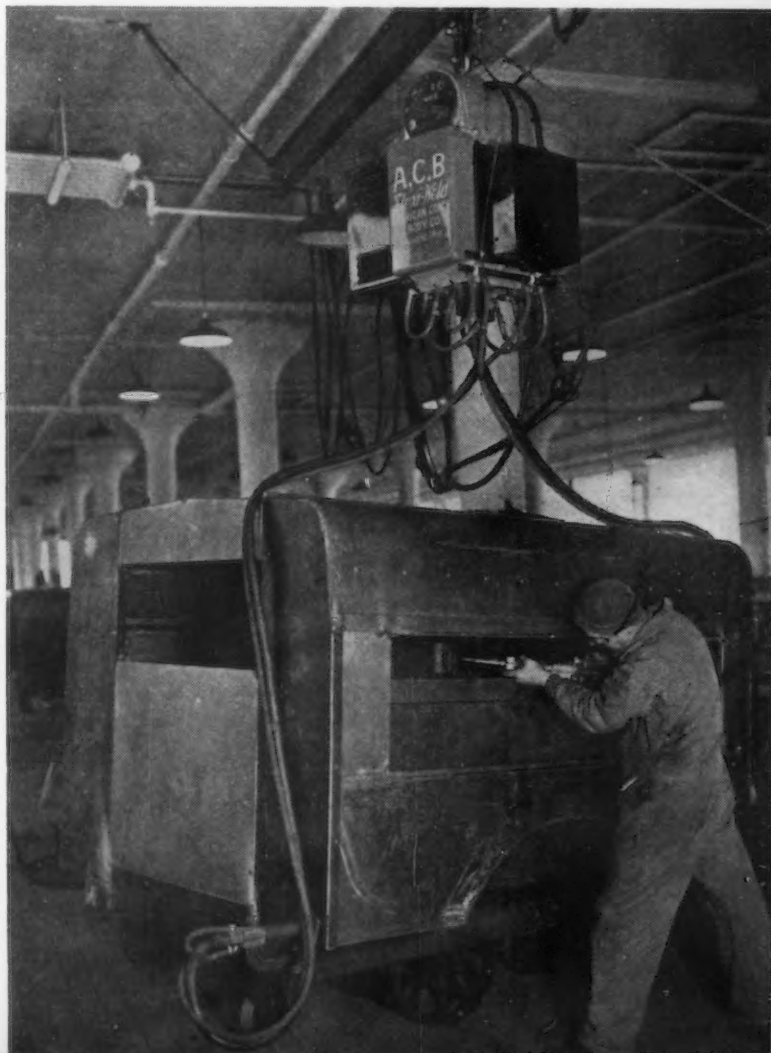
The product manufactured in a utility truck plant is the body. These are custom built for various purposes to meet the special requirements of the utility companies. The truck manufacturer mounts these bodies on any standard automobile chassis specified by the customer.

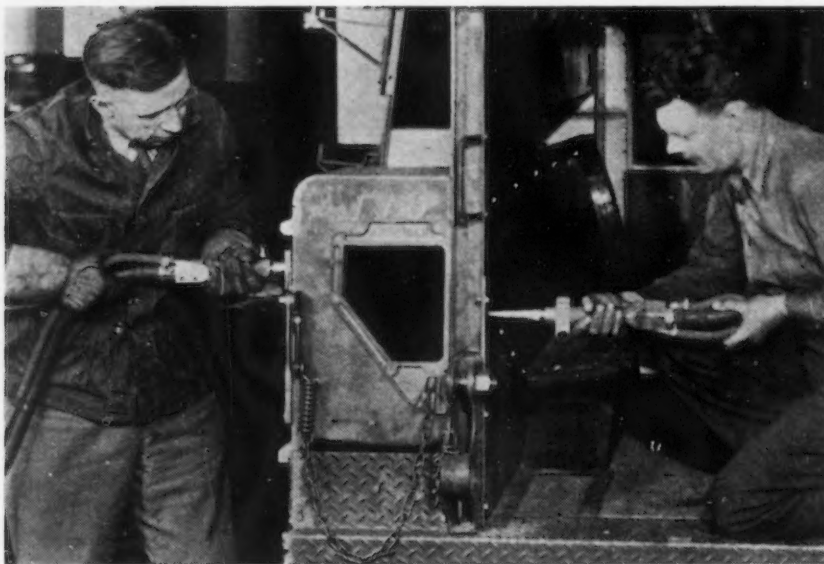
One of the leading manufacturers of utility trucks is the American Coach & Body Co., Cleveland. This company recently moved into a new plant, tripled its former capacity and laid out this plant for more economical production. An outstanding change in its fabricating methods is the substitution of welding for riveting in the fabricating of the truck bodies. Utility trucks might be designated as traveling work shops completely equipped for the service for which they are used as well as a means of transportation for the crew. They are fitted with winches, power take-offs, reels and other mechanical equipment and have a multitude of compartments and small trays fabricated of sheet steel for the numerous tools and supplies

used in field work. In assembling the body 400 welds are required. Including compartments, trays, and other equipment, the welds number 1500 to 2000. In fabricating trays and other parts that are attached to the body the welding is done in stationary spot welding machines.

Difficulties confronted the company when it sought a way of fabricating its bodies by welding. They were too cumbersome to be taken to stationary spot welders and no portable gun type welding machines were found on the market that proved suitable for the particular job. A welder was

ONE electrode is grounded by being clamped to the body frame, and welding of 16-gage and lighter stock within a radius of 6 ft. is done with the other electrode.





**A**UXILIARY equipment on utility trucks is also attached by welding.

wanted that would function with one electrode on the inside of the body and the other on the outside, with the electrodes sometimes separated as much as 6 ft. so that welding could be done within that radius.

Necessity being the mother of invention, the company developed a spot welder to meet its requirements and is now successfully using many of these machines on production work.

The outstanding feature of this welder is that it has separate twin electrodes with flexible leads up to 12 ft. long, the unit including the electrode handle, point holders and points, all weighing less than 10 lb. each. One electrode is grounded by being clamped to the body frame and all welding of 16-gage and lighter stock within a radius of 6 ft. is done with the other electrode. Bodies, it is stated, are being fabricated by welding in less than half the time that was required when assembling was done by riveting.

In the fabrication of truck bodies the bed members of heavier gage steel are joined by arc welding and riveting. The bed is built on special trucks on which the body is later assembled and welded. Arc welding is used for attaching the body to the thicker gage steel in the bed.

Sheet steel for the body members goes to benches where the work is laid out from blueprints. The pieces are cut to size with shears

and are formed on forming presses and bending brakes. The parts then go to the assembly floor where the body is built on the bed, the pieces being assembled in the proper position by locating points and jigs. The transformer of the welding unit used in body assembly is suspended overhead from a short monorail or from a jib crane.

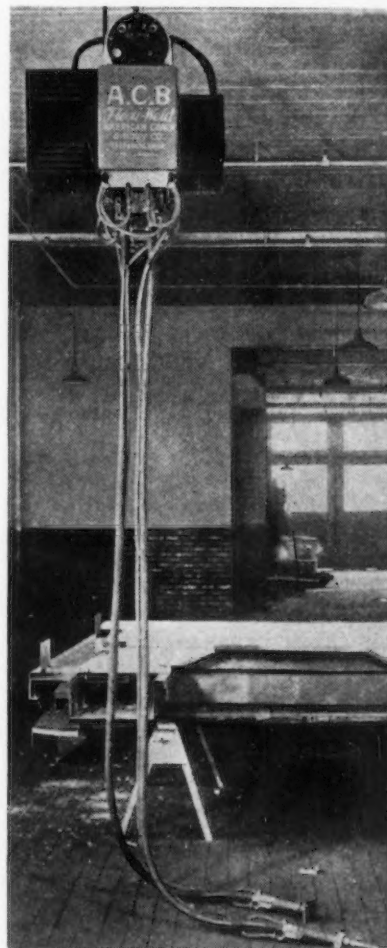
The plant has nine spray booths each large enough to accommodate a truck and provide room for painters. After the body is mounted, the trucks go to these booths where they are spray painted and then strip finished and lettered.

The welder transformer, of 75-kva. capacity, has primary coils of electrolytic copper with heavy insulation to insure long life against grounds and shorts. The secondaries are of Baron copper amply proportioned to carry the heavy induced current for welding. They are internally water-cooled by water passages through their sections. The primaries and secondaries are interleaved. The core is of silicon armature steel. The transformer is housed in an aluminum case. The primary is tapped to give a 50 per cent range of heat variations in output at the electrodes.

The heat regulator is built into the transformer housing, one panel on each end marked "coarse" and "fine." Heat is changed by changing the voltage by means of taps and slip-plug handles.

The leads from the transformer are of Super-Flex cable of ample proportion and water-cooled. They are said to be flexible enough to go around an 8-in. radius and light enough to permit the operator to handle the lead and handle with ease on continuous production. The electrode handles are of electrolytic copper and these, it is stated, may be disconnected from cables and reconnected in five minutes. The handles have point holders that may be quickly removed and special point holders substituted. The point holders are made an alloy of high conductivity and interchangeable. A multiple parallel internal cooling system is provided designed to keep the transformer, cables, handles, point holders and points cool under all working conditions.

The contactor is magnetically operated, making and breaking both sides of the supply line at once so that when not welding, no current flows into the transformer. The contactor is mounted on the



**T**HE bed members of the truck body are made of heavier gage steel and are joined by arc welding and riveting.

side of the transformer housing or may be mounted adjacent to the welder. Any timer suitable for the work may be used.

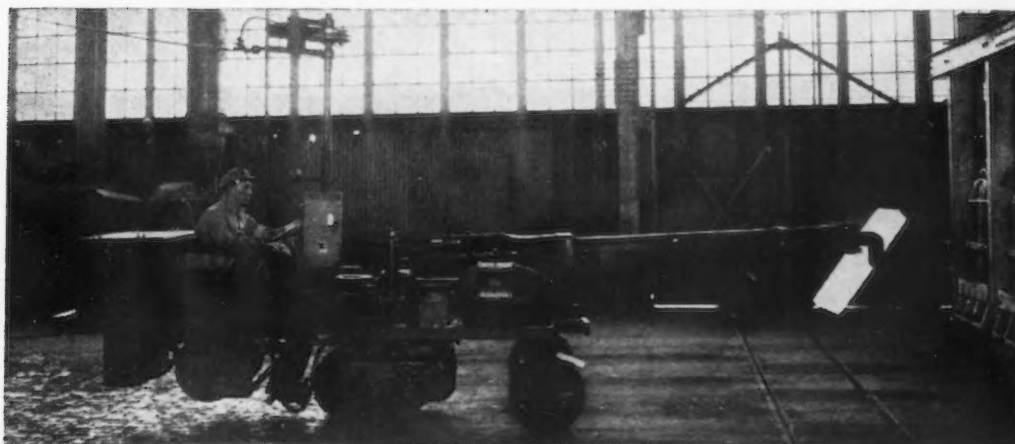
While the welder is designed to weld sheets of 16 gage and lighter to any thickness, it is stated that it has, with the use of sufficient pressure, successfully welded 12 to 14 gage stock, although the aver-

age workman cannot exert enough pressure manually to weld stock of the latter gages.

Advantages claimed for the welder are its portability, flexibility and adaptability. The pliant cable leads and twin electrodes, together with the mobile mounting of the transformer, provide, it is pointed out, a wide range of flexi-

bility which makes the unit adaptable for welding automobile bodies, refrigerators, metal furniture, air conditioning equipment, metal boats ship construction and toys.

The company decided after the welder proved successful in its own work to place it on the market and has given it the designation of A.C.B. Flexi-Welder.



## Auto Floor Charging Machine

TO meet the demand of the efficient charging equipment for the smaller open hearth and heating furnaces, where the expense of installing the usual floor type of machine would be prohibitive, there has been developed a comparatively inexpensive charging device called an Auto Floor Charging Machine. This is a compact, self-contained unit, mounted on three rubber-tired wheels and driven by an electric motor. The tilting of the peel, the operation of the tongs or, in the case of melting furnaces, the rotation of the charging box are accomplished by means of oil cylinders actuated by an oil pump direct driven by an electric motor. The three-wheel arrangement provides a very flexible machine, particularly adapted to operation in congested areas, as the machine can be rotated on its own wheel base. Its movement is not restricted to any definite path, and when not in use can be run out of the way, leaving the charging floor free from obstruction. There are no tracks obstructing the charging floor and no need for expensive overhead runways.

The Auto Charger was originally developed a number of years ago for serving a heating furnace and handling bundles from the furnace to a mill. It had a capacity of 4000 lb. and proved so successful that it has been modified to suit various special requirements, and its capacity increased until now one of these machines is serving double-row heating furnaces, handling up to 10,000 lb. blooms in and out of the furnaces and to and from the roller table of a roughing mill. It is also being used for turning the blooms in the furnace. The larger machines are provided with a hydraulically operated steering mechanism so that the operator steers the machine by merely operating a small valve.

The machine shown in the illustration is a small one handling billets from 7 in. square, weighing 170 lb., to 12 in. square, weighing 552 lb. The travel of the machine is motor-driven, while the operation of the tongs and tilting of the peel is air operated.

No provision, aside from a good floor on which to operate, is neces-

sary for the installation of these Auto Floor Chargers, as they are shipped complete, ready to operate.

These machines are designed and built by Edgar E. Brosius, Inc., or its European distributor, Dango & Dienenthal, Siegen, Westphalia, Germany.

## Fairless to Speak at Purchasing Agents' Dinner

BENJAMIN F. FAIRLESS, president, Carnegie-Illinois Steel Corp., will address the National Association of Purchasing Agents at its dinner meeting on May 24 at the William Penn Hotel, Pittsburgh. His subject will be "The Steel Industry."

John H. Van Deventer, editor, THE IRON AGE, will also speak on the same occasion on the subject: "The Consumer Is King — So What?"

## Schenectady's New All-Welded A



# ed Armory Rises

**H**UNDREDS of tons of structural steel for the new state armory at Schenectady, N. Y., were swung into place during January, but to date not a single riveter's hammer has shattered the peace of the surrounding neighborhood. Within a hundred yards of the site two hotels and a Y.M.C.A. house hundreds of persons who would not have known that a large steel-framed building was being erected were it not for the change in the skyline.

Figuratively "sewed together" by electricity under the watchful eyes of General Electric welding engineers and J. R. Keays, designer in charge, the new Schenectady armory has three other unique claims upon the attention of engineers and construction men. It has the largest welded plate girder and the largest welded arches of any building in the United States and a continuous welded floor framing designed to increase the strength and stiffness of the floor.

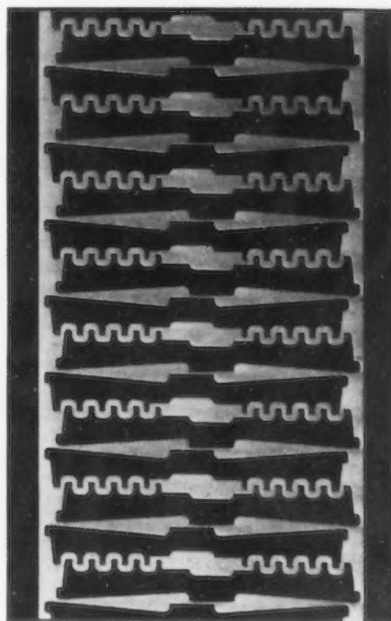
The plate girder, 92 ft. long, has been fabricated by the electric arc welding process and is now in place. The plate girder is 16-in. wide and has a smooth surface. Over the drill shed three arches with a span of 150 ft. have already been erected, and more are to follow. The continuous type of steel frame has been used in the construction. Steel girders have been welded together in all directions, resulting in continuous beams extending the full length and width of the drill shed. In effect the beams act as a series of continuous suspension bridges.

This comparatively new method of steel construction has resulted in flowing lines of steel which give a unique character to the architecture of the armory. The technique has heretofore been tried on a smaller scale, and its use in the present instance is being watched



with interest by builders. H. F. Hendrich is general contractor, the Mallory Construction Co. is field

erector, and the Belmont Iron Works in charge of factory fabrication.



## Stainless Steel Decorative Frieze

**A**LLEGHENY STEEL CO., Brackenridge, Pa., is now manufacturing a stainless steel decorative frieze fabricated of Allegheny metal cold rolled strip. The new product is designed for use in stores, restaurants, back-bars and other architectural applications of similar character where border effects are desired.

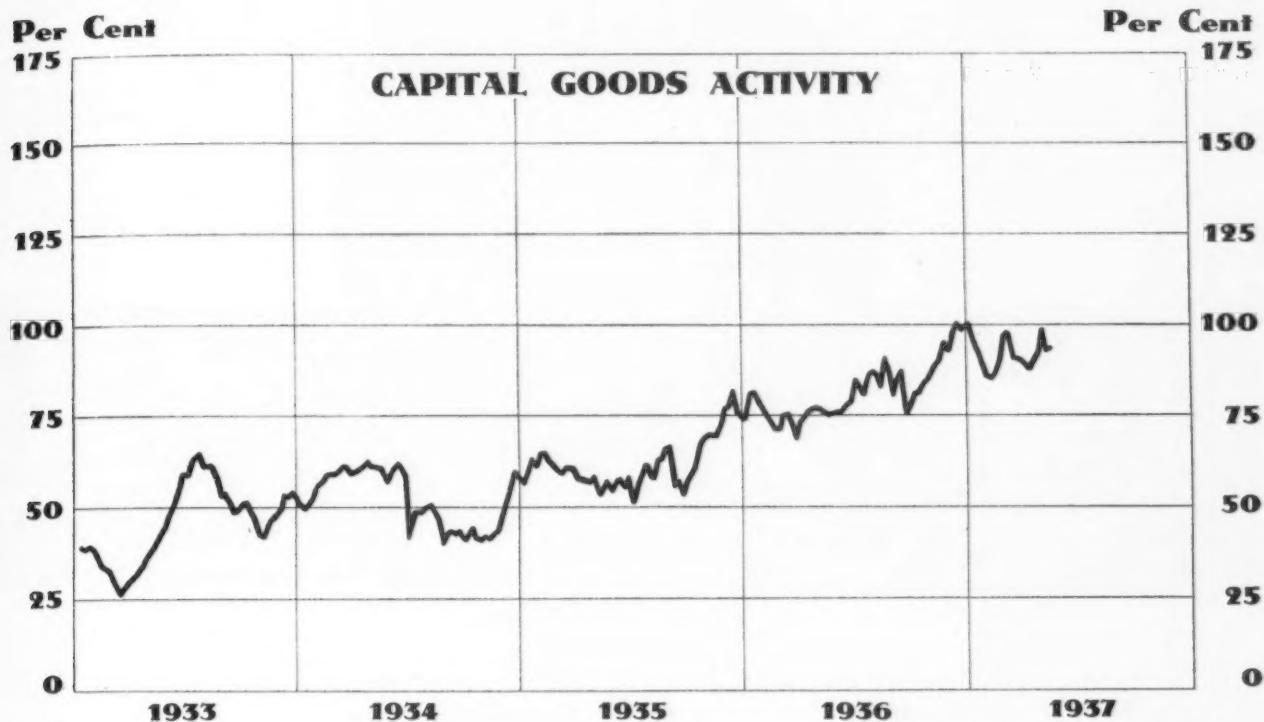
The frieze has a bright, white pickled finish and may be used effectively on either wood, plaster or metal surfaces. It is available in random lengths of from four to eight ft. by 6 15/16 in. wide.

# Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	March, 1937	February, 1937	March, 1936	Three Months, 1936	Three Months, 1937
<b>Raw Materials:</b>					
Lake ore consumption (gross tons) <sup>a</sup> .....	5,142,496	4,443,306	2,897,867	8,481,741	14,280,114
Coke production (net tons) <sup>b</sup> .....	4,849,363	4,283,681	3,366,665	10,110,549	13,762,576
<b>Pig Iron:</b>					
Pig iron output—monthly (gross tons) <sup>c</sup> .....	3,459,473	2,999,218	2,040,311	5,889,902	9,670,191
Pig iron output—daily (gross tons) <sup>c</sup> .....	111,596	107,115	65,816	64,724	107,447
<b>Castings:</b>					
Malleable castings—production (net tons) <sup>d</sup> ...	67,521	57,295	45,536	134,345	133,742
Malleable castings—orders (net tons) <sup>d</sup> .....	68,525	60,187	48,008	130,138	182,782
Steel castings—production (net tons) <sup>d</sup> .....	.....	92,678	51,674	143,926	.....
Steel castings—orders (net tons) <sup>d</sup> .....	.....	95,693	71,341	182,061	.....
<b>Steel Ingots:</b>					
Steel ingot production—monthly (gross tons) <sup>e</sup>	5,229,431	4,424,659	3,342,619	9,352,983	14,390,787
Steel ingot production—daily (gross tons) <sup>e</sup> ...	1,180,458	1,106,165	754,542	719,460	1,119,035
Steel ingot production—per cent of capacity <sup>e</sup>	90.13	84.46	57.61	54.93	85.44
<b>Finished steel:</b>					
Trackwork shipments (net tons) <sup>e</sup> .....	10,720	8,153	6,258	13,740	26,119
Sheet steel sales (net tons) <sup>f</sup> .....	.....	.....	251,818	564,867	.....
Sheet steel production (net tons) <sup>f</sup> .....	.....	.....	207,820	622,179	.....
Fabricated shape orders (net tons) <sup>g</sup> .....	182,049	88,946	108,826	370,133	401,644
Fabricated shape shipments (net tons) <sup>g</sup> .....	131,691	91,848	107,687	265,885	315,559
Fabricated plate orders (net tons) <sup>d</sup> .....	68,899	30,340	30,437	97,009	139,663
U. S. Steel Corp. shipments (tons) <sup>h</sup> .....	1,414,399	1,133,724	783,552	2,181,281	3,698,041
Ohio River steel shipments (net tons) <sup>i</sup> .....	122,100	88,170	116,510	196,052	306,670
<b>Fabricated Products:</b>					
Automobile production, U. S. and Canada <sup>k</sup> ....	*518,715	383,637	438,992	1,117,172	1,301,681
Construction contracts, 37 Eastern States <sup>l</sup> ....	\$231,245,900	\$188,257,300	\$198,761,900	\$553,973,800	\$662,347,200
Steel barrel shipments (number) <sup>d</sup> .....	995,407	724,738	660,551	1,720,572	1,720,572
Steel furniture shipments (dollars) <sup>d</sup> .....	\$2,515,169	\$2,071,847	\$1,585,800	\$4,656,391	\$6,761,668
Steel boiler orders (sq. ft.) <sup>d</sup> .....	1,516,128	†854,836	589,676	2,023,427	3,022,027
Locomotive orders (number) <sup>m</sup> .....	29	33	13	73	108
Freight car orders (number) <sup>m</sup> .....	6,200	10,532	627	8,913	27,613
Machine tool index <sup>n</sup> .....	211.6	165.2	105.3	†109.4	†192.4
Foundry equipment index <sup>o</sup> .....	294.2	249.5	115.0	†117.4	†244.8
<b>Foreign Trade:</b>					
Total iron and steel imports (gross tons) <sup>p</sup> ....	51,802	41,628	56,720	150,567	136,493
Imports of pig iron (gross tons) <sup>p</sup> .....	10,720	11,340	23,743	53,436	34,494
Imports of all rolled steel (gross tons) <sup>p</sup> ....	31,457	23,134	22,046	63,212	89,000
Total iron and steel exports (gross tons) <sup>p</sup> ....	570,576	290,987	264,337	714,777	1,063,255
Exports of all rolled steel (gross tons) <sup>p</sup> ....	186,531	115,335	92,606	237,719	412,186
Exports of finished steel (gross tons) <sup>p</sup> .....	173,428	104,007	86,676	223,318	381,111
Exports of scrap (gross tons) <sup>p</sup> .....	355,979	143,197	163,295	469,366	568,060
<b>British Production:</b>					
British pig iron production (gross tons) <sup>r</sup> .....	680,300	603,700	633,600	1,813,800	1,934,700
British steel ingot production (gross tons) <sup>r</sup> ....	1,109,500	995,900	980,100	2,831,100	3,104,300
<b>Non-Ferrous Metals:</b>					
Lead production (net tons) <sup>s</sup> .....	43,642	37,451	35,150	105,573	124,729
Lead shipments (net tons) <sup>s</sup> .....	63,425	50,375	36,743	104,419	159,518
Zinc production (net tons) <sup>t</sup> .....	53,202	37,794	42,411	120,209	131,043
Zinc shipments (net tons) <sup>t</sup> .....	59,635	46,953	38,087	124,274	157,815
Deliveries of tin (gross tons) <sup>v</sup> .....	9,080	7,675	5,520	17,755	24,370

† Three months' average. \* Preliminary. † Revised.  
the Census; <sup>a</sup> American Iron and Steel Institute; <sup>b</sup> National Association of Flat-Rolled Steel Manufacturers;  
<sup>c</sup> American Institute of Steel Construction; <sup>d</sup> United States Steel Corp.; <sup>e</sup> United States Engineer, Pitts-  
burgh; <sup>f</sup> When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of  
Census; <sup>g</sup> F. W. Dodge Corp.; <sup>h</sup> Railway Age; <sup>i</sup> National Machine Tool Builders Association; <sup>j</sup> Foundry  
Equipment Manufacturers Association; <sup>k</sup> Department of Commerce; <sup>l</sup> British Iron and Steel Federation;  
<sup>m</sup> American Bureau of Metal Statistics; <sup>n</sup> American Zinc Institute, Inc.; <sup>o</sup> New York Commodities Exchange.



**THE IRON AGE Weekly Index Numbers of Capital Goods Activity**  
(1925-27 Average = 100)

Last week .....	93.2	Same week 1934 .....	60.4
Preceding week .....	92.0*	Same week 1933 .....	41.6
Same week last month .....	89.9*	Same week 1932 .....	36.6
Same week 1936 .....	75.8	Same week 1931 .....	69.3
Same week 1935 .....	54.6	Same week 1930 .....	101.8
		Same week 1929 .....	126.3

\* Revised.

**A**CTIVITY in the production and distribution of durable goods showed a slight gain for the last week, based on corrected figures for the previous week, according to THE IRON AGE seasonally adjusted index. Owing to an error in transcribing, carloadings of forest products were shown at 70,182 cars, the actual loadings of iron ore and a figure not used in computing the index. The correct figure is 37,162 and the past week saw a small increase to 37,316 cars. The current index figure is still substantially above that of a year ago. The ingot rate remains unchanged from the previous week. Automotive production fell off 1.5 per cent, but this loss was offset by gains in heavy construction and in the Pittsburgh indices of production and shipments. Engineering construction awards at \$62,701,000

represent the second highest week of the year and are 5 per cent above the dollar volume of the previous week. The Pittsburgh indices rose upon resumption of activity after the second flood scare of the year.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity) .....	92.0	-0.5
Automobile production (number of cars and trucks) .....	139,507	-1,768
Railroad loadings of forest products (number of cars) .....	37,316	+154
Pittsburgh industrial production and shipments (index number) .....	106.3	+4.0
Construction contracts awarded (total value) .....	\$62,701,000	+\$3,250,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from Engineering News-Record.

# THIS WEEK ON THE ASSEMBLY LINE



*... Pamphleteering is Ford's first step to sell employees against union which has opened quarters for fight against him.*

o o o

*... Whirlwind drive launches independent union in Great Lakes Steel Corp. plant.*

o o o

*... General Motors to build at Rochester for accessory factory; Dodge buys at Kokomo, Ind.*

o o o

*... Auto production still near peak but new strikes cut total slightly to 139,507 for last week.*

**D**ETROIT, May 17.—Henry Ford and the United Automobile Workers Union meet these days in a crucial battle to decide whether Ford employees will be organized to bargain collectively with the Ford company. It is a lone fight for Ford, who always has stood alone, and is going to be a new kind of fight for the UAW, which never before has dealt with such a strong-minded, individualistic and thoroughly competent adversary. The whole country watches, of course, but most keenly interested of all are the Ford competitors, all of

whom have just been through losing battles with organized labor.

In the automobile industry there still is resentment over the report that Ford refused last winter to become party to a general shut-down previous to the strike wave. Frankly, little sympathy is given to Ford by the industry as a whole, although many individuals recognize in him the only promise of a defense against general domination of the industry by a too-powerful, irresponsible labor element.

Broadsides of "Fordisms" are being loosed by the company in its

initial attack on the principle of unionism. These Ford homilies, printed on cards that are billfold size, were ordered distributed by Harry Bennett, personnel director, and were passed out today to 150,000 on the Ford payrolls. Workers were advised to consider whether they wish "to join the union and thereby put their neck in an iron collar" and "whether it is necessary to pay some outsider every month for the privilege of working at Ford's."

These cards were authorized after it became known that the union was really set to begin its drive at the Rouge plant very soon. During the week just past, the union heads gathered in secret to settle on final details and to decide the question of a headquarters for the attack. Finally the West Side local, which has handled the Ford program to date, revealed that its old office was considered too small and that a larger building, at Maybury, Grand and Michigan Avenues, on one of the important thoroughfares leading to Ford's, had been purchased. Included is an auditorium that will seat 500 persons. Besides, the union is opening two smaller offices in Dearborn, the seat of the Ford empire.

## Martin Seems To Be "On Top"

Homer Martin, UAW president, said that "plenty of organizers" will be mobilized for the campaign. He refused to commit himself on the number of Ford men already in the union, but there is a handy gage in the figures that are available. Those of the 90,000 Rouge plant



workers who are part of the union belong to the West Side local, which, including all 36 plants organized on the West Side, has only 18,000 members.

Martin, incidentally, seems to be temporarily the victor in the political fracas that has marred recent conclaves of union officers. Buried in a report on a recent meeting of the general executive board, two paragraphs told the tale and, in the absence of any explanation from the UAW, the conclusion is drawn that in the future Martin will not be required to confer with any of the other general officers on matters of policy between regular meetings of the board, where his control is a tested fact. The meat of the above-mentioned paragraphs is in the sentence: "It was the opinion of the board that the constitution calls for the president to be responsible directly to the executive board."

When 16,000 General Motors workers were off during the last week as the result of strikes in Saginaw, Cleveland, and Janesville, Wis., another 17,000 were faced with layoffs at Chevrolet's Flint plants. Officials of the corporation admitted that, since the general strike, it has been impossible to build up any bank of castings or other supplies and parts, so a few more hours without pouring in the two Saginaw foundries would have crippled all the rest of Chevrolet. Wyndham Mortimer spent an evening in Saginaw trying to avert the shutdown, but the workers booed and hissed him out of the meeting

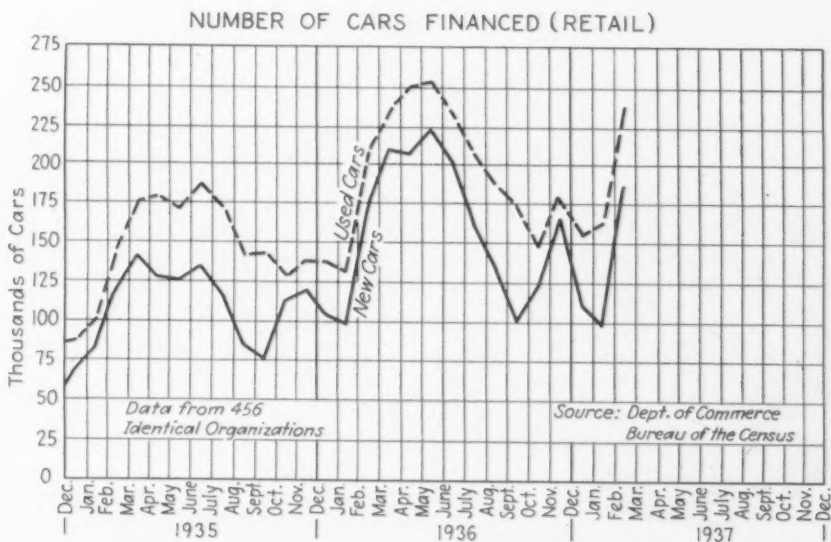
he tried to address. Wage differentials caused by a union request for a change from piece rates to hourly wages were blamed for the disputes.

#### Great Lakes Workers Organize Independent Union

Employees of the Great Lakes Steel Corp. at Ecorse opened offices for an independent union after permanent organization had been effected Thursday. This follows rumors that CIO organizers had been greeted by strong arms near the plant and had been reporting to headquarters that they were having little success with the steel workers. The new group announces that a committee of seven employees spent 15 days in organizing, and that the results of their efforts are

shown by the election of officers, at which 1340 men are said to have voted. There are 4800 employees in the Great Lakes plants. After this whirlwind of organizing, the name, Independent Steel Workers Association, was revealed along with the officers named: F. J. Heavner, president; Frank Moss, vice-president; Edward B. Scholl, secretary, and Frank Nolan, treasurer. ISWA immediately opened offices near the plant. The next day, Friday, demands were made on the management. Results still are pending, but the secretary, Scholl, reported that the negotiation committee "thinks we are getting some place."

The kind of thing that small tool and die shops fear is what has happened in a small hat manufacturing plant in this city. Forced to sign





QUOTE . . . . .

"For eight years we have been building the master tools and equipment used by our many customers . . . our skilled organization operating precision machine tools insure extreme accuracy with speed and economy. We are exceptionally well pleased with the results we obtained with the Pratt & Whitney Jig Bore, Lathes, Vertical Shapers, etc. To these machines we credit much of our success in satisfied customers . . . . ."

*Harry Boyar*

*This picture shows three new P&W Model "C" Lathes—each with the new Cam-Lock Spindle Nose—installed in the Boyar-Schultz shop. They are precision machines built by and for master craftsmen. Their presence in a shop is proof that that shop can deliver a quality product at a reasonable price.*

## There is no substitute for quality...

QUALITY—ACCURACY—FINISH—mean more today than ever. This year's products look better and work better because their quality has been improved. There are no short cuts. "Good enough" never can substitute long for "best".

It is the same with machine tools. You need precision to produce precision. What was good years ago is not sufficient today. Pratt & Whitney machines continue to occupy their high place in industry. They are quality products, capable of producing the finest work. Time and again they have proved the truth of our slogan, "There is no better paying investment than the right tools for the job". We will be glad to tell you about them and what they do.



# Pratt & Whitney

Division Niles-Bement-Pond Co.

• HARTFORD, CONN.

a union contract in which wages, according to the management, were out of line with rates paid by competitors, the shop was obliged to close. On Saturday the Crown Hat Mfg. Co., which has been operating since 1902, cleared out of its establishment permanently. During negotiations the company offered to run with the union as a cooperative, according to Arthur D. Mitchell, its president and founder. "Now," he declares, "we will pay off 100 per cent, but there will be nothing left for us."

#### General Motors To Build Big Plant at Rochester, N. Y.

After last week's announcement in THE IRON AGE about General Motors huge expansion program there comes word of one of the corporation's biggest projects—a 400,000 sq. ft., single-story building which will spread over 66 acres at Rochester, N. Y. This factory will manufacture all kinds of automotive accessories and will employ about 3000 men in addition to the 1800 working for the GM Delco Appliance Division at Rochester.

Purchase of the old Haynes automobile plant at Kokomo, Ind., by Dodge division of Chrysler was revealed during the week. This project has been "on the fire" with several others for some time. Now it looks as if Dodge will duplicate much of its Detroit equipment there. This is part of the automotive trend to spread out and to add heavily to capacity, as well as to decentralize. Just how far the idea will be carried, it is difficult to say, but most

automotive executives are agreeing with the trend, and enough of them have instituted such programs to lead to the conclusion that there will be more of it.

#### Canadian Expansion Probable

Canadian expansion offers a particularly fertile field. American capital investment in Canada already is heavier than that of Great Britain, United States investments totaling more than \$3,956,000,000 at the end of 1936 compared with \$2,824,000,000 invested in the Dominion by citizens of Great Britain, according to official Canadian computations. The difference of \$1,132,000,000 in the U. S. column probably will be augmented, with encouragement from Ottawa.

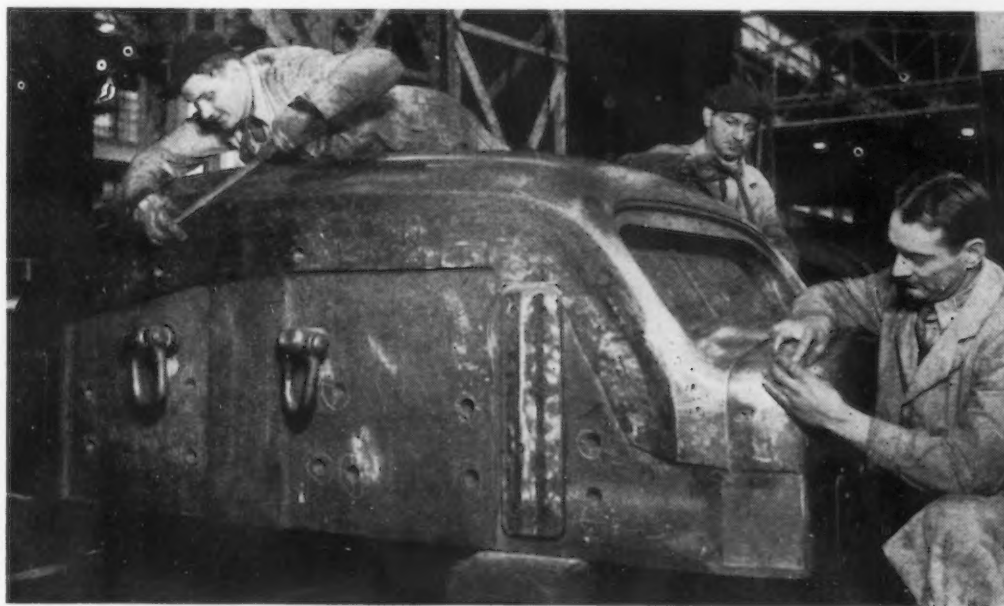
Showing which way the creek flows, automotive people are acting on the demand that 70 per cent of parts of Canadian assembled cars must be of Canadian manufacture, Chrysler, with its new Windsor engine plant being an example. As a matter of fact, American manufacturers will not be loath to comply. It fits in with the trend to decentralization and, besides, Canadian labor, even organized, is cheaper than in our automotive centers. With higher American retail prices coming, Canadian prices will be in a relative position that should put many Canadian buyers into the market. Heretofore price has been the bugaboo to big sales in Canada. With prices lowered, the improved road system in Eastern Canada, and growing prosperity, many can see a rapidly growing market there.

Offsetting the glow of promises and predictions is, of course, Ford's record in Canada in 1935. This, incidentally, is the only case where operating figures on Ford are available, Ford's personally owned properties in this country not revealing their financial operations. The total expenditures in Canada of the Ford Motor Co., Ltd., exceeded by \$7,000,000 the total receipts from company sales, according to Wallace R. Campbell, president. The company, however showed a net profit for the year of \$3,358,470 partly as the result of overseas sales of Ford units produced in Canada.

#### Automobile Output Lower

It took a new wave of labor disturbances and the influence of normal spring factors to slow down automobile assembly lines and reduce the week's output to 139,507, compared with 141,275 for the week before last, according to Ward's Automotive Reports. The corresponding figure for last year was only 116,855. Ward's data also paint a pleasant picture of automotive exports. "Following news that shipments of cars abroad during the first quarter of the year amounted to 15,577, including parts of assemblies sent overseas, predictions are being made that exports of automobiles during the current year should come to about 500,000 units," the report says. The first quarter gain is 25.4 per cent over the 1936 shipments. As in the case of Ford of Canada, this overseas business will be a strong lure for firms thinking of opening Canadian auto factories.

**BOONDOGLING** in a die shop—big dies, but small changes. In general, the automotive tool and die program for 1938 models is very light, only Packard having extensive changes under way. The photograph, showing a 20-ton top half of a die for Plymouth's present (1937) steel top, pictures repolishing operations necessary to keep the die in service. Incidentally, Packard will use dies similar to this next year, when it will introduce cars with single-piece steel tops; present models have an insert top.





*A Mennonite's market stall near the home of Lebanon Steels.*

## **... and the flowers you admire**

WHEREVER SEEN, at the market stall, in the garden, on the table, flowers are unlikely to suggest the glowing, molten metal of the steel foundry.

Yet there's a link between Lebanon Stainless Steels and the flowers you admire. The link is the fertilizer that feeds roots in the garden. The engineer of any plant in the chemical process industries could tell you of the vital role played by stainless steels in the handling of phosphates, nitrates and other fertilizer bases.

The processing of these chemicals exposes equipment to the severest corrosion. For fertilizer men, the advent of Lebanon "Circle L" Stainless Steels was a blessing—without disguise. The remarkable corrosion resistance of these alloys was recognized as the answer to many problems of long standing. Today, they fight in the cause of lower costs under the banners of many of America's greatest industries.

**HIDDEN PROFITS?** In your own plant, profits may lie hidden beneath corrosion's ugly face. Equipment damage and replacements which you have accepted as inevitable may vanish with the introduction of "Circle L" Alloys. Know! Arrange an appointment between your plant engineer and a Lebanon specialist—others have found it paid.

**LEBANON STEEL FOUNDRY • LEBANON, PA.**



*Stainless and Special  
Alloy Steel Castings*

## **Productivity as a Remedy for Inflation**

UNEMPLOYMENT is relatively greatest in the industries with low productive efficiency, according to the results of a study recently made by the well-known business economists, Allen W. Rucker and N. W. Pickering. The study, which includes such industries as newspaper printing, chemicals, meat packing, leather, men's shirts, cotton textiles, automobiles, machinery and machine tools, is published in booklet form by Farrel-Birmingham Co., Inc., Ansonia, Connecticut. Three periods of the business cycle are included; the 1923-1929 period of prosperity, the 1930-1933 period of depression and the 1933-1936 period of recovery. To quote the authors:

"The contention that reemployment of the unemployed is to be achieved by reducing productivity per capita has no basis in fact. The presence of unemployment in industry side by side with increased productive efficiency has induced a sort of primitive reasoning that the two are cause and effect.

"The facts are that the industries with the highest efficiency and employing the fewest persons per \$100,000 of conversion values show generally the best records for increasing and maintaining total employment. They do so for the obvious reason that they successfully market more units of output and, hence, need more men and more man-hours to produce them.

"According to the new measure of efficiency developed, the newspaper industry produces \$100,000 of conversion values with the employment of only 9.1 men per annum; the chemical industry employs 14.8 men per \$100,000 of conversion value; automotive 21.1 men and electrical machinery 23.4 men. Yet these industries lead in employment recovery whereas industries such as leather with 32.8 men per \$100,000 of conversion values produced and cotton textiles with 64.1 men lag far behind.

"The argument against increased production per capita comes simply to this: that the greatest unemployment is common to the industries with the greatest efficiency and productivity, and the worker's job security is best protected in the industries of relatively less productive efficiency. Hence, the pressure to bring under Federal control the industries regarded as most efficient. . . . The plausibility of the theory has resulted in labor leaders, politicians and pseudo-economists neglecting the simple step of checking the end-results in confirmation of their theory."

The authors conclusively point

out that industrial history provides no factual basis for the prevailing theory but instead clearly shows that employment is most secure in the industries noted for improved equipment and methods.

## Ford Motor Launches All-Welded Ship

**A**N all-welded steel ship was launched, May 15, in the Rouge River, Detroit, by her builders, the Ford Motor Co. The vessel, a 300-ft. motorship, has not a single rivet in its hull, according to the Ford company. Shipbuilders viewed the launching as marking the revival of shipbuilding on the Great Lakes since the ship is the first to be completed in more than six years. The new ship has been named the Green Island, for the Ford branch at Green Island, N. Y.

Within a month a sistership, the Norfolk, will be sent down the ways, bringing the Ford-owned fleet to 30, with seven of the craft listed as ocean-going freighters.

## New Arc Electrode For Special Steels

**A** HEAVY coated shielded arc electrode for welding low alloy and high carbon, high tensile steels has been brought out by the Champion Rivet Co., Cleveland, and is designated as the Champion Blue Devil-85. This electrode, it is stated, can be used in any position, flat, vertical and overhead and is designed to weld effectively and produce welded joints having all the individual characteristics inherent in such steels as Cor-ten, Man-ten, Sil-ten, Chromansil, Hi-Steel, 70-90, Yaloy, R.D.S., and HT 50, and also in carbon molybdenum steel, silicon killed plate (A.S.T.M. 149 and 150) and the low nickel content steels.

Test data, welding procedure and other technical information will be supplied by the main office of the Champion Rivet Co.

## Stainless Steel Used for Billboard

**A** 40-ft. billboard, erected by Joseph T. Ryerson & Son, Inc., at its Chicago plant, employs what is believed to be the first application of stainless steel for outdoor billboards. The billboard was fabricated from 24 gage Allegheny 18-8 stainless steel.

# Have you enough light for precision work like this?

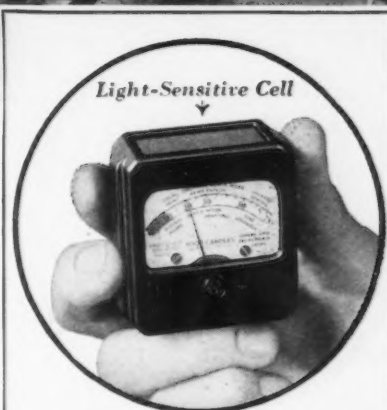


*This drilling operation requires care and exactness which better lighting of more than 100 footcandles helps insure.*

## LIGHT METER has answer

Certain kinds of close seeing, precision work require from 50 to 100 footcandles of light to be done efficiently and with minimum eye-strain. Yet in many plants today skilled workers are struggling along with 10 or 15 footcandles simply because no one ever measured the lighting or attempted to find out how much light various seeing tasks need.

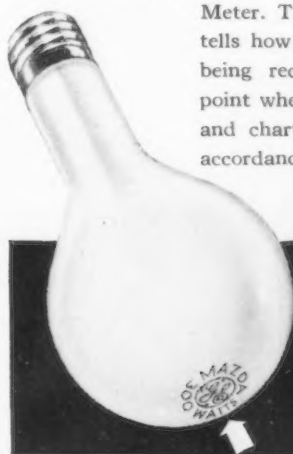
To save men and money, many plant managers and superintendents are making regular check-ups with a General Electric Light Meter. This instrument tells how much light is being received at any point where it is placed, and charts prepared in accordance with modern



**MEASURE LIGHTING WITH NEW G-E LIGHT METER** The G-E Light Meter indicates light as simply as a thermometer measures temperature. Every plant executive should have one. Costs \$11.50.

seeing requirements tell how much light is needed for different shop and office tasks.

For specific information write to General Electric Company, Dept. 166, Nela Park, Cleveland, Ohio.



**GENERAL ELECTRIC**  
**MAZDA LAMPS**

*They stay brighter longer*

# WASHINGTON. . . . .



*... Ellenbogen bill to determine an effective public policy toward steel industry may soon be reported out of committee.*

. . .

*... Action on this and other related matters rests largely on position President takes on wage and hour legislation.*

. . .

*... Action of SWOC in at first refusing to submit collective bargaining at J. & L. mills to vote was embarrassing to administration.*

By L. W. MOFFETT

*Resident Washington Editor,  
The Iron Age*

WASHINGTON, May 18.—Representative Henry Ellenbogen, who hails from the great steel city of Pittsburgh, has told THE IRON AGE that his resolution to determine "an effective public policy toward the iron and steel industry" is "at rest." Mr. Ellenbogen did not use the phrase in a funereal sense. Rather, the implication was that the measure remains in a state of animated suspension before the House Committee on Rules, ready to be blessed by the committee and then dance out on the floor for consideration by a body of 435 steel experts.

The resolution was introduced in March, sharp on the heels of the report on the steel industry made by the Bureau of Business Research, University of Pittsburgh. At the time, President Roosevelt asked that he be shown a copy of the report. The inference was that

he wanted to study it, if not do something about it. But the White House has said nothing since to indicate whether the report had been read, or, if so, what the administration reaction was.

The Wheeler anti-basing point bill, exhaustively considered at the previous session, and reintroduced by its author, Senator Wheeler of Montana, lies quiescent before the Interstate Commerce Committee, which the Montana Senator heads. Just at this time, the Senator, off the administration reservation, is busily engaged smacking the President's Supreme Court packing plan, hip and thigh.

Attorney General Homer S. Cummings recently submitted a report to the White House which grew out of a complaint by the perpetually complaining Secretary of the Interior, PWA Administrator, and high guardian of business morals, etc., the Hon. Harold L. Ickes, about so-called collusive bids on steel sheet piling. The Attorney General, qualifying his findings, blamed the basing point system "in part" as the cause for identical bids. Taking the subject matter as a basing point for enlarging his observations, he painted a picture in which he smeared the anti-trust

laws, painting them as weak and crumbling, "as interpreted by the courts," perhaps a neat slam at the judiciary, timed to boost the Supreme Court packing plan. The upshot was an inevitable recommendation for an investigation into the anti-trust laws with a view to amending and strengthening them, though some of the most prominent trust-busting advocates say the laws need no further strengthening. The White House approved the suggestion that a committee be set up to engage in the foray on the laws, and it is assumed it will be announced soon and the investigation be turned over to Robert M. Jackson, in charge of the anti-trust division of the Department of Justice. What will emerge from the "drive" remains unknown.

On the basing point matter itself, the Attorney General passed the buck back to the Federal Trade Commission and the commission cheerfully accepted the token. It would be lonely without this hobby.

## FTC Still Harps on Basing Point System

Whether by coincidence or otherwise, the commission issued a complaint against the Birmingham-plus system shortly after the



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Attorney General's report was submitted. Directed at cast iron pipe makers who use the Birmingham-plus system, the commission effort is a broadside against the entire basing point system as used by a number of basic industries. The commission view is that if it can abolish the Birmingham basing point system, it can, through the Federal Trade Commission Act and the Robinson-Patman Act, abolish the system from all industries, regardless of whether it is a single or multiple system, the

latter being used by the steel industry. Answers to the complaint in the Birmingham-plus case are due on Thursday of the present week.

Action on these legislative and administrative activities probably rests largely in the hands of the President, and now that he has returned from his tarpon fishing he may make known his purposes soon, along with plans he apparently has in mind for wage and hour legislation, coupled likely with strong industry - regimentation

legislation—provided the court plan goes his way. Which faces a rugged road.

It is definitely doubted that the Ellenbogen resolution for a thoroughgoing quiz into the steel industry with Government control will get anywhere unless the Presidential approval is given to it. Such approval so far has not been indicated.

Despite the split between the President and Senator Wheeler on the Supreme Court plan, the White House conceivably might get back on the anti-basing point bill. This because the measure really is an FTC bill and the President likes the FTC. There is also the usual haze about the trust busting campaign of which the suit against the Aluminum Co. of America may be an opener—or perhaps the whole course is a gesture. President Green of the American Federation of Labor wants big business investigated, contending that prices have risen more rapidly than wages, and has taken a particularly sharp dig at steel, apparently without reading reports on steel wages, employment, and earnings as carefully as he should.

The thing that stands out, however, is the constantly growing yen for investigations, probes, studies, examinations, inquiries and buzzes in general. There can be no suspicion by the virtuous-minded that there is politics in these crusades, nor an appeal to the "masses" whose voting power is great; nor a play to the lime-light or love of power; nor, in the view of those so minded, are they straw men to maintain appropriations from which a gigantic bureaucracy suckles, tapping the taxpayer, boosting ever mounting, unprecedented deficits; the while giving lip service to economy in government.

One investigation is missing and unfortunately will remain absent—an investigation of the investigators.

\* \* \*

#### SWOC Embarrasses Administration

WASHINGTON welcomed the settlement of the Jones & Laughlin steel strike, followed by settlement of the Pittsburgh Steel situation. It was welcomed not alone for the sake of peace. Whether correct or not, the opinion here is that the SWOC boys permitted their impetuosity to get the better of them and the situation got out of hand of the leaders. Once the Jones & Laughlin disturbance started, however, they had to put on a front of approval and indulge in a tirade about an "unholy alliance" among steel companies to break up the union. The silliness



3 Ton MonoRail System installed in San Diego Plant, Consolidated Aircraft Corp.

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of the outburst was proved by developments.

Union officials well knew that J. & L. was strictly within the Wagner act in demanding that the Amalgamated Association of Iron, Steel and Tin Workers, "subsidiary" of SWOC, which in turn is a subsidiary of John L. Lewis's CIO, prove its right to be the exclusive collective bargaining agent. And when SWOC balked at the proposal that the National Labor Relations Board conduct an election to see who is who, it put itself in an untenable position and embarrassed Washington. For the Washington administration, deeply indebted for the financial support of CIO and its campaign, did not enjoy the prospect of having to tell SWOC that it was off-side and that the steel company was well within bounds. Perhaps Washington would have tossed the ball back to the Pennsylvania authorities, to the tender mercies of Governor Earle, as it did—but before validation of the Wagner act—to Governor Murphy of Michigan, on a previous occasion. In any case, Washington gave a loud sigh of relief when SWOC, taming the strikers, realizing its hapless position, agreed to let the NLRB supervise the election. The President himself had been drawn into the picture when the independent union demanded that he have the NLRB conduct an election. It was also good news to Washington that this peaceful settlement has been extended, including plans for an election for Pittsburgh Steel Co. employees.

\* \* \*

#### SWOC Begins Attack on Lukens

MOVING over to eastern Pennsylvania, the SWOC, through the Amalgamated Association, is spreading its campaign to build up labor control of the steel industry. To this end it has selected the Lukens Steel Co. as its first objective in the East. Upon petition of the Amalgamated, the NLRB has issued a complaint that the company discharged Charles W. Brown for union activity; distributed circulars with the intention of interfering with the workers' rights of self-organization; has by threats of discharge caused several employees to take an oath that they will not join the Amalgamated and has dominated an organization known as the Lukens Employees' Association. Hearing will be held May 24 in the Y. M. C. A. building in Coatesville by Regional Director Stanley W. Root, of Philadelphia.

On the same date at 45 Broadway, New York, Miss Elinore M. Herrick, regional director, will

hold a hearing on a complaint that the Habirshaw Cable & Wire Corp., subsidiary of the Phelps Dodge Copper Products Corp., discharged two employees and refused to reinstate them because of their union activity. The complaint is based on charges filed by Local 3, International Brotherhood of Electrical Workers.

Also on May 24 at the Guarantee Title building in Cleveland, a trial examiner of the NLRB will hold a hearing on a complaint that

Thompson Products, Inc., discharged workers for union activity and discouraged membership in the United Automobile Workers of America, which filed the charges.

As had been predicted, the Supreme Court decision validating the Wagner act has multiplied the activities of the already active NLRB and its regional boards. But it will be more interesting to watch it perform when called upon, as sooner or later it will be, to choose by elections between CIO

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BOILER PLANT COAL AND FOUNDRY SAND HANDLING EQUIPMENT • CHAINS, SPROCKETS AND BEARINGS  
STEEL DRUM PAINTING, PAINT DRYING AND DRUM RECONDITIONING EQUIPMENT

and A. F. of L. unions as collective bargaining agencies. It is a good bet that the NLRB will not face this ticklish job until forced into it.

Where the CIO is in doubt that it has a majority, elections invariably are expected to be preceded by strikes in order to insure the outcome in balloting.

## Says Europe Needs Our Machine Tools

A CONTINUANCE of good export demand from Europe for machine tools and other American products is predicted by Clifford S. Stilwell, vice-president Warner & Swasey Co., Cleveland, who has just returned from an extended trip to England and the Continent.

Mr. Stilwell was impressed by the rising living standards abroad and the tremendous industrial housing projects that have been completed in England and also in many of the European countries. He found business very active all over Europe, particularly in England, and declared that the industrial upturn in England and in many countries on the Continent is so pronounced that it can by no means be attributed purely to rearmament activities.

"With normal business as active as it is today, both in England and on the Continent," said Mr. Stilwell, "it is my belief that American manufacturers can look forward to at least another two years of good export trade. Machine tools, for instance, are needed in Europe in large quantities, entirely independent of the demand for rearmament purposes. Furthermore, on the Continent defense programs are not materializing at any such rate as has apparently taken place in England. I would say that basically the demand for American-made machine tools arises, just as it does in this country, from the growing use of modern conveniences and devices."

Bids will be opened next Monday by the Bureau of Supplies and Accounts, Navy Department, for approximately 100 tons of corrosion resisting steel bars for delivery to the Norfolk, Va., Navy Yard, for use in the manufacture of turbine blades for destroyers. Award for approximately 45 tons of similar bars, also for the Norfolk delivery for the same purpose, was made last Thursday to the Republic Steel Corp. by lot drawing.

## Steel Taxes in 1936 Equaled \$169 Per Worker Against \$134 in 1935

TAXES paid by the steel industry in 1936 were equivalent to a year's pay for 74,500 employees, representing an outlay of \$169 for each employee on the payrolls during the year, according to the American Iron and Steel Institute.

In 1935, taxes were equivalent to \$134 per steel employee and represented a year's pay for 55,640 workers.

During the year a total of \$105,850,000 was paid in taxes to Federal, state and local governments by 107 iron and steel companies which produced more than 90 per cent of the industry's output of finished products.

The aggregate of taxes paid last year was 50 per cent larger than in 1935, when the same group of companies paid out \$70,837,000 in taxes. Social security taxes, both Federal and state, which were levied on 1936 payrolls for the first time, accounted for \$9,845,000 of the \$35,000,000 increases in taxes.

The amount of social security taxes levied on the payrolls of the industry in 1937 is expected to be materially greater than the 1936 total, because of larger payrolls, the addition of the tax for old age pensions, and the higher rate of tax for unemployment insurance reserves.

Figures concerning tax payments are not available for most of the companies prior to 1935, but reports from 25 steel companies, representing a large part of the industry's capacity, show that more than \$553,000,000 in taxes were paid in the eight years 1929-1936. This sum is equivalent to \$3.37 on each ton of finished steel produced by the companies during the period, and represents 4.6 per cent of the companies' total gross sales.

Tax payments of the 107 companies in 1936 amounted to 12c. for each dollar of the total \$889,634,000 paid out by the same companies in payrolls, which compares with taxes of little more than 10c. per dollar of their 1935 total payrolls of \$671,661,000.

Moreover, the taxes paid were substantially equal to the total of \$109,240,000 paid out in dividends to the 456,106 stockholders of the companies.

States and municipalities in which the plants and properties of the industry are located received the largest share of the taxes paid, although their share of the steel

tax dollar in 1936 was 22 per cent smaller than the average of the preceding seven years because of increased Federal taxes. In 1936 state and local governments got only 63c. out of each dollar in taxes paid by the steel industry, as against an average of 81c. from 1929 through 1935.

## Engineering Society To Honor Eight Men

EIGHT Cleveland men who are prominent in national engineering and technical societies, seven of whom are now presidents and one a vice-president of national associations, will be honored at the annual meeting of the Cleveland Engineering Society, June 8. These men are: R. C. Allen, vice-president Oglebay, Norton & Co., who is president of the American Society of Mining and Metallurgical Engineers; James H. Herron, president James H. Herron Co., who is president of the American Society of Mechanical Engineers; A. M. MacCutcheon, vice-president Reliance Electric & Engineering Co., who is president of American Institute of Electrical Engineers; Albert E. Gibson, president Wellman Engineering Co., who is president of American Welding Society; C. Clarke Wales, chief engineer of Otis Steel Co., who is vice-president of the Association of Iron and Steel Engineers; Prof. Henry B. Dates, Case School of Applied Science, who is president of the Illuminating Engineers Society; B. J. Schwendt, assistant signal engineer New York Central Railroad, who is chairman of the signal section, Association of American Railroads, and A. D. Taylor, president American Association of Landscape Architects.

Dr. William E. Wickenden, president of Case School, will preside at the meeting.

The Cleveland Engineering Society will move its headquarters June 1 from the Hanna Building to Guild Hall in the Builders Exchange Building. The new club rooms will provide larger and better arranged quarters and rooms for meetings of Cleveland chapters of various engineering and technical societies that are affiliated with the Cleveland Engineering Society. Restaurant facilities will be available in adjoining rooms.



# Atkins

## SAWS

### HAVE TEETH THAT BITE!

● Nature provides all wild animals with strong, sharp teeth. Animals are dependent upon them to exist. Saws, too, depend on good teeth for long life and useful service.

● Atkins engineers combine 80 years' experience in tooth design with Silver Steel . . . Atkins exclusive saw steel . . . to give every Atkins Silver Steel Hacksaw Blade extra strong, sharp teeth that bite . . . quick . . . smooth . . . and clean.

● Real hacksaw blade economy is based not on price, but on the amount of work each blade will do accurately. On this basis, the record of performance of Atkins Silver Steel Hacksaw Blades in metal cutting plants everywhere, proves that they will save production dollars for you.

● Test them your way. See your distributor.



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SILVER STEEL  
**SAWS**

SAWS, SAW TOOLS, AND  
MACHINE KNIVES, ETC.

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WARNER S. HAYS, who has heretofore headed his own consulting, engineering and association executive office in Philadelphia, has been appointed managing director of the American Welding Society, New

York. He is a past-president of the American Trade Association Executives. Following his graduation from the Sheffield Scientific School of Yale University, he became identified with the engineering department of the General Electric Co. Leaving the latter company, he became purchasing agent and assistant general manager of the Interurban & Traction Lines, Rockford, Ill. He later entered the publishing field with the McGraw-Hill Publishing Co., and

remained there until the outbreak of the War, when he entered the construction division of the Army.



W. S. HAYS

Since that time he has been engaged in consulting work.



HARRY M. WHITTAKER has become associated with the Micro-matic Hone Corp., Detroit, manufacturer of honing machine tools, as chief engineer. He will have complete administration of the company's engineering design and sales engineering work. Mr. Whittaker has had wide experience both as consultant and sales engineer in tooling up many high production applications for automotive and aircraft engine manufacturers, and has designed and engineered many



Special Design to lift coils of Strip Steel VERTICALLY.

**OHIO LIFTING MAGNETS**—Of improved design giving Maximum All Day Lifting Capacity.

**OHIO SEPARATION MAGNETS**—With Stronger Pulling Capacity.

**OHIO MAGNET CONTROLLERS**—With Automatic Quick Drop to speed up operation and with Ohio Arc Suppressor to reduce the arc and make the Contacts and Arc Shields last much longer.

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Cleveland, Ohio



H. M. WHITTAKER

machine tool developments in those industries. He formerly was associated with Ex-Cell-O Corp., Detroit, and, until recently, was head of the Whittaker Engineering Co., Detroit.



M. W. FLOTO has been named assistant manager of Chicago district

sales by the American Steel & Wire Co. Mr. Floto was manager of sales at Detroit for 13 years and during the past four years was assistant to the vice-president and general manager of sales of the wire company.

PHILIP P. EDWARDS has resigned as vice-president of the Kearney & Trecker Corp., Milwaukee, to become affiliated with the Ingersoll Milling Machine Co., Rockford, Ill., in an executive capacity. Before becoming associated with the Kearney & Trecker Corp., about six years ago, Mr. Edwards was an officer of the First Wisconsin National Bank of Milwaukee.

JOHN B. THOMAS has been appointed manager of the Atlanta district sales office of the Wheeling Steel Corp. Mr. Thomas succeeds R. F. SMITH, whose duties are transferred to special sales activities. Mr. Thomas had been as-



J. B. THOMAS

sistant manager of the wire sales division located at Wheeling, W. Va.

A. F. RIEBANDT has been appointed vice-president of the Waukesha Tool Corp., Waukesha, Wis., manufacturer of reamers. He has been active in tool engineering during the past 27 years. He started with the Barber-Colman Co., Rockford, Ill., and later was works manager of the Illinois Tool Works, Chicago, and then with Goddard & Goddard Co., Detroit, and superintendent of the National Tool Works, Cleveland.

H. O. K. MEISTER has been appointed general manager of the Hyatt Bearings Division of General Motors Corp. at Harrison, N. J., succeeding the late H. J.

Forsythe. Mr. Meister started to work for the Hyatt Roller Bearing Co. as assistant sales manager in 1914, transferring two years later to Chicago with the Tractor & Implement Bearings Division of Hyatt and becoming sales manager in 1920 for that division. In 1925 he became general sales manager for Hyatt and in 1929 assistant general manager. Previous to his connection with Hyatt, he had studied in the Extension Department of the University of Wisconsin and had worked in the shops and engineer-

ing department of the Allis-Chalmers Mfg. Co. He was born in Milwaukee 49 years ago.

JOHN J. KRAUS has been named as customer service man for the Detroit district by the Sharon Steel Corp. He is a graduate of Gettysburg College and formerly was in a follow-up department of the Ford Motor Co.

FLOYD M. ERLMEYER has been appointed western New York rep-

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PERKINS MAN COOLERS are easily moved by overhead crane, making them quickly available anywhere. By providing refreshing recirculation of air at the same temperature the men are working in, they maintain production in the hottest places. This means contented workers, fewer errors, fewer accidents. Made in OSCILLATING and STATIONARY types (both portable).



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representative, with office at 253 Alexandria Street, Rochester, N. Y., for the Maas & Waldstein Co., Newark, N. J.

♦ ♦ ♦

FRANK C. THOMPSON, purchasing agent for the Link-Belt Co., Indianapolis, has been elected president of the Purchasing Agents Association of that city, succeeding SPENCER M. RAYMOND. Other officers elected were: Vice-president, GEORGE C. MERCER, P. R. Mallory

& Co., and secretary, JOHN T. CASEBOURNE, Esterline-Angus Co.

♦ ♦ ♦

KENNETH B. KOMP has been appointed direct factory representative in Michigan and Ohio for the Billings & Spencer Co., Hartford, Conn. He will make his headquarters at 300 Bates Street, Detroit.

♦ ♦ ♦

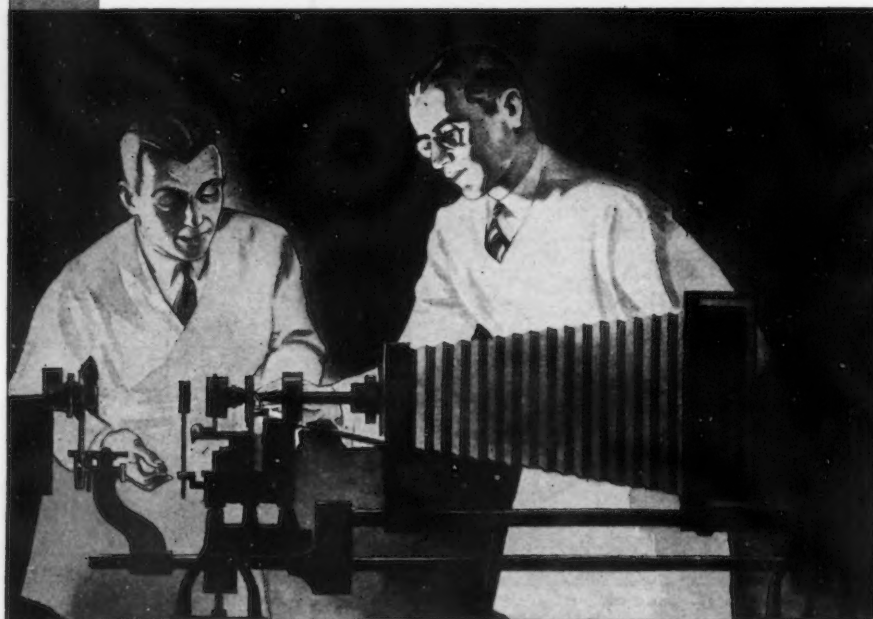
RAYMOND C. BULLARD, since 1932 advertising and publicity manager of the Bullard Co., Bridgeport,

Conn., has been elected a director. He has been identified with the company since his graduation from college. He served a period of six years as an engineering student in the various departments of the



R. C. BULLARD

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Manufacturers of Carbon and Alloy Steels  
Turned and Polished Shafting, Turned and Ground Shafting  
Wide Flats up to 12' x 2'

manufacturing division and, after a considerable period in the sales engineering department, entered the advertising division of the company.

♦ ♦ ♦

WILLIAM W. PEATTIE has been elected president, and REED C. ZENS, secretary and treasurer of the Northern Engineering Works, Detroit.

♦ ♦ ♦

DR. GILBERT E. DOAN, who has been associate professor of metallurgy in the department of metallurgical engineering at Lehigh University, has been promoted to the position of professor of metallurgy.

♦ ♦ ♦

L. B. ALLIASON, for many years engaged in transmission gear manufacturing as engineering representative, has joined the staff of the National Broach & Machine Co., Detroit, as sales engineer. He was formerly identified with the tool and gear department of the Ford Motor Co.

♦ ♦ ♦

GEORGE MACNOE, who has been associated with the Foster Wheeler, Ltd., St. Catharines, Ont., for the past eight years, has been elected president. He was formerly identified with the Foster Wheeler Co. in the United States and is a graduate of Cornell University. JOHN PRIMROSE, the newly-elected vice-president of the Canadian company, received his formal technical training at McGill University.

♦ ♦ ♦

J. R. HECKMAN, for the past five

years Chicago district sales manager for the Midvale Co., Philadelphia, has resigned to become district manager of the General Alloys Co. in the same territory. J. C. GLASS, who has been associated with the Midvale Co. for the past 17 years in the Cleveland district, will succeed Mr. Heckman in Chicago.

## Wickwire Spencer Reorganized

AFTER concluding one of the longest industrial receiverships on record, the Wickwire Spencer Steel Co., producer of specialty wires and wire products, an-



E. C. BOWERS

nounces the dissolution of the trusteeship under which it has been operating and the formation of a new company under the same name.

In October, 1927, E. C. Bowers and C. L. Feldman were appointed receivers of the Wickwire Spencer Steel Co., which had been formed in 1920 by the combination of the Wickwire Steel Co. of Buffalo and the Clinton-Wright Wire Co. of Worcester, Mass. After continuing for seven years, the receivership was changed to a trusteeship on July 31, 1934, and the company reorganized on May 1 of this year.

Officers of the new company are E. C. Bowers, president; P. M. Macklin, executive vice-president; R. L. Foster, vice-president and general sales manager, and George H. Creveling, secretary and treasurer.

The American Wire Fabrics Corp., manufacturer of insect screen cloth, and the Wickwire

Spencer Sales Corp. continue as subsidiaries, and all branch offices and warehouses continue as in the past at New York, Buffalo, Chicago, San Francisco, Worcester, Los Angeles, Portland, Seattle, Philadelphia, Chattanooga, Tulsa.

## Trackwork Shipments Rise 100 Per Cent

SHIPMENTS of track work for T-rail track of 60 lb. and heavier, advanced from 13,740 net tons

in the first quarter of 1936 to 26,119 net tons for the same period of 1937, according to a report issued by the American Iron and Steel Institute.

Annual shipments of track, including switches, switch stands, frogs and guard rails, for both domestic and export use, amounted to 162,115 net tons in 1929 and declined to 27,278 net tons in 1932. Shipments in 1936 totaled 68,813 net tons.

Step Production up another notch



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You can get more work into a Superpower set-up—for there's more *working magnetic area*. You can finish smaller pieces—for the faceplate mesh is finer. You can increase your machine capacity—for Superpower provides greater clearance under the wheel or tool. And you get *extra* holding power . . . to cope with today's higher

machine speeds and feeds.

These exclusive Superpower features total up to an appreciable increase in production capacity for grinders, planers, shapers, etc. And what's more—Superpowers are built to last as long as the machines on which they're used.

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WOONSOCKET



RHODE ISLAND

THE IRON AGE, May 20, 1937—67

## ...OBITUARY...

JOHN CHRISTENSEN, president of the Cincinnati Gear Co. and former president of the American Gear Manufacturers Association,

died last week aboard the S. S. Pil-sudski while on his way to the Coronation in England and his annual visit to Denmark. He was 67 years old. Mr. Christensen had planned on attending the Coronation and then he was to go to Denmark, where he was born, to attend the silver jubilee anniversary of King Christian. Mr. Christensen was knighted by King Christian, of Denmark, 10 years ago and was to

have had an audience with the Danish sovereign while there for the King's anniversary. While a boy, he left Denmark for the sea and after several years on sailing vessels, went to Philadelphia where he obtained employment in a machine shop. Several years later he purchased a small hardware store in Philadelphia. His wife worked in the store during the day, while Christensen worked in the machine shop, and he was behind the counter in their store at night. Pooling his savings with another Danish youth, Soren Sorenson, in 1907, Christensen and Sorenson bought a carload of machine shop equipment and shipped it to Cincinnati

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Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

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**THE BISSETT STEEL COMPANY, Cleveland, O.**  
*The Tubing Specialists*



JOHN CHRISTENSEN

whence the two started the present company, of which Mr. Sorenson is treasurer.

♦ ♦ ♦

JOSEPH WILLIAM BOWMAN, veteran steel manufacturer who had operated in Pittsburgh since 1889, died last week at his home in Pittsburgh. He was president of the American Steel Band Co., president of the Bowman Supply & Mfg. Co., and vice-president of the Bostwick Steel Lath Co., Niles, Ohio.

♦ ♦ ♦

GILBERT M. BLACK, pioneer Pittsburgh industrialist and former vice-president of the Park Steel Co., died May 11, aged 85. Mr. Black was in charge of operations at the Park Steel Co. before it was merged with other plants to form the Crucible Steel Co. of America. He retired 15 years ago.

♦ ♦ ♦

CHARLES F. BIRTMAN, founder of the Birtman Electric Co., Chicago, died May 11.

♦ ♦ ♦

EDWARD V. CROUSE, who was equipment engineer for the Inter-

*The Best Shear Blade  
You Can Buy Carries  
This Mark*

MORE TONNAGE PER  
EDGE OF BLADE



**AMERICAN SHEAR KNIFE CO.**  
HOMESTEAD, PENN.

national Harvester Co. for 45 years, died May 11.



WILLIAM W. HANOLD, who had been identified with the Johns-Manville Corp. for the past 64 years, died in the Peck Memorial Hospital, Brooklyn, on May 2, aged 87 years. Serving by turns as office assistant, shipping clerk, advertising manager, salesman and contract manager, in recent years, Mr. Hanold was known as the company's librarian and historian.



## ..TRADE NOTES..

Standard Alloy Co., Inc., Cleveland, manufacturer of heat and corrosion-resisting castings, specializing in nickel chrome alloy, has acquired the site at 1679 Collamer Road, where it has been located for the past 10 years. The property is improved with three buildings, one of which the company occupied about two years ago.

Ex-Cell-O Corp. is the new name recently adopted by the Ex-Cell-O Aircraft & Tool Corp. of Detroit.

Republic Steel Corp. announces the removal of its export department to the 13th floor of the Chrysler Building, New York. D. H. Bellamore is general export manager.

Reed-Prentice Corp., Worcester, Mass., has appointed J. L. Osgood Machinery & Tool Co., 43 Pearl Street, Buffalo, as exclusive agent in the Buffalo territory covering the sale of Reed-Prentice products.

Lincoln Electric Co., Cleveland, has appointed William Sivyver, and B. B. Ross to the sales staff of its Philadelphia office, which is under the management of George R. Johnson.

C. F. Evans, formerly manager of the Georgia Lead Co., has resigned and is building a lead manufacturing plant in Atlanta to be known as the Evans Metal Co.

Athenia Steel Co. has moved executive and sales offices to the company's plant at Clifton Avenue, Clifton, N. J.

Independent Air Filter Co., Chicago, has located its general offices in the Builders Building, 228 North La Salle Street.

Boston Gear Works has appointed H. L. Dickie, 314 36th Street, Brooklyn, as distributor.

Homestead Valve Mfg. Co., Inc., Coraopolis, Pa., has appointed as representatives Warren Bruce & Co., 3908 Olive Street, St. Louis, and Proctor Engineer-

ing Co., Inc., 106 Key Highway, Baltimore.

Joseph T. Ryerson & Son, Inc., has moved its downtown Chicago office to rooms 1013 to 1015 First National Bank Building.

La Salle Steel Co., Chicago, has appointed Robert Liles, New Orleans, as representative in Alabama, Louisiana and Mississippi.

Carpenter Steel Co., Reading, Pa., has appointed Schnitzer Alloy Products Co., 164 Broadway, Elizabeth, N. J., as jobbers in the northern New Jersey area.

Elizabeth Iron Works, Inc., Elizabeth, N. J., has moved general offices to 61 First Street.

Century Electric Co., St. Louis, has moved its New York office to the Underwood Building, 30 Vesey Street.

For accurate screening of minerals, chemicals and all hard-to-screen materials. Special layouts and sizes to insure maximum production with minimum screening costs.

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"Durock" and "Silveroc" hammer boards can take it, which means that they won't let you down when your drop hammer output is scheduled high.

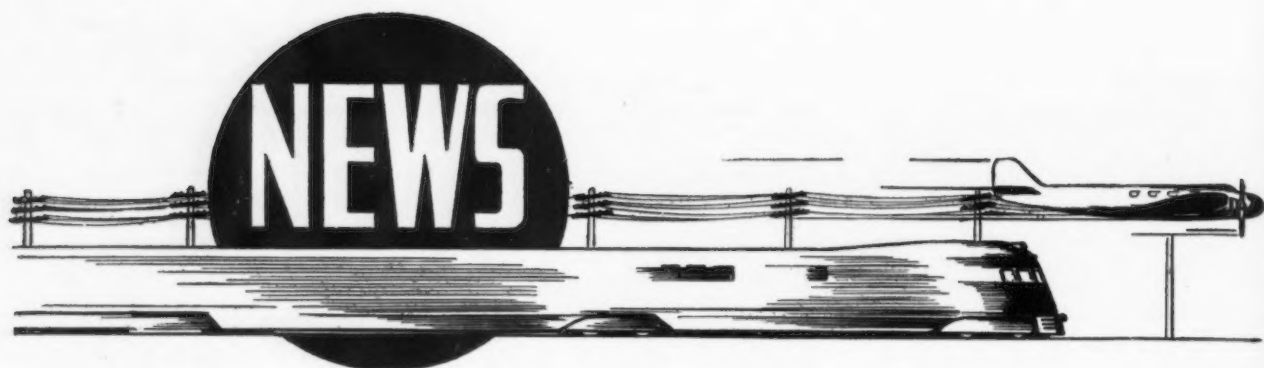
"Durock" and "Silveroc" are considered the best in hundreds of forge shops. Protect your production with these Pennsylvania Rock Maple hammer boards!



- TOUGH
- PLIABLE
- STRAIGHT GRAINED
- PENNSYLVANIA ROCK MAPLE

**H.G. IRWIN LUMBER CO.,**

ERIE, PA.



## Jones & Laughlin Strike Settled by Agreement for Vote on May 20

**A** GOVERNMENT - SUPERVISED election, the first major one of its kind in the steel industry, was the basis for settlement of the strike last week at plants of Jones & Laughlin Steel Corp. On May 20 employees of Jones & Laughlin will decide whether they desire the Steel Workers' Organizing Committee as their sole collective bargaining agent. The offer of Jones & Laughlin accepted by the SWOC was the same as that proffered to the latter previous to the time union members struck at the company's plants, causing 27,000 workers to be idle.

The consent election will be supervised by the regional director of the National Labor Relations Board and the polling places may be off company property, depending upon arrangements between the parties involved. In this type of election, wherein the company

agrees with the other party to the election, red tape is dispensed with, eliminating delays such as occur when the NLRB orders an election on the basis of petitions presented by employees or groups of employees. Under this latter method, public hearings, orders, etc., are required.

Prime factor in the election this week is the stipulation that the majority of those participating in the election (not necessarily a majority of the payroll) will determine the collective bargaining agent. Employees voting will indicate on the ballot by a "yes" or "no," whether they desire the SWOC as their sole representative for collective bargaining. Practically the same solution was used in settling the one day strike at the plants of the Pittsburgh Steel Co. The definite date for Pittsburgh Steel supervised election, while ex-

pected early in June, has not yet been disclosed.

Other terms agreed upon by Jones & Laughlin and the SWOC stipulated that the company would not interfere, coerce or restrain any employees in the right of self-organization and that the company would give full cooperation to the NLRB representative in preparations for holding the consent election. The corporation further agreed that, pending the final determination of the election, it would carry out and respect the same terms and conditions of the standard agreement now in effect between the SWOC and other steel companies which have signed contracts. In the event a majority of those participating in the election select the SWOC as their collective bargaining agency, Jones & Laughlin agrees to negotiate and sign an exclusive bargaining contract for all its employees with the

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SWOC. All employees returned to work without discrimination.

The SWOC has indicated it will demand the same type of negotiations in its dealing with companies which have not signed contracts. A definite strike threat has been made against three large independent steel companies unless negotiations looking toward a sole collective bargaining election are entered into, but it is the opinion of most observers that the union will await the outcome of the Jones & Laughlin election before taking definite

action, provided it can maintain control of union members.

Following the settlement of the Jones & Laughlin strike, both H. E. Lewis, chairman of Jones & Laughlin Steel Corp. and Philip Murray, SWOC head, intimated that the negotiations were amicable throughout. Mr. Lewis said, "All concerned met the situation in the spirit of the day and both sides desired to be helpful in deciding the problems. Mr. Dewey of the United States Department of Labor was very constructive, as was Mr.

Moser of the Pennsylvania State Department of Labor. We are happy that our employees have resumed work. The meeting was very amicable and we are pleased that no trouble occurred during the negotiations." In speaking of the settlement, Mr. Murray, SWOC head, said, "The agreement represents what we believe to be the most constructive proposal that has yet been effected between management and labor for the peaceful disposition of grievances in the steel industry."

Although Jones & Laughlin offered a signed contract with the SWOC provided other groups could have an identical contract which they had asked for, the union refused to accept these terms. While the provisions of the Wagner Act do not require a signed contract, the steel company, in offering another proposal, agreed to a contract for exclusive collective bargaining with the group or organization obtaining the votes of a majority of employees at an election at its plant under the supervision of the NLRB. At that time the SWOC turned this proposition down also.

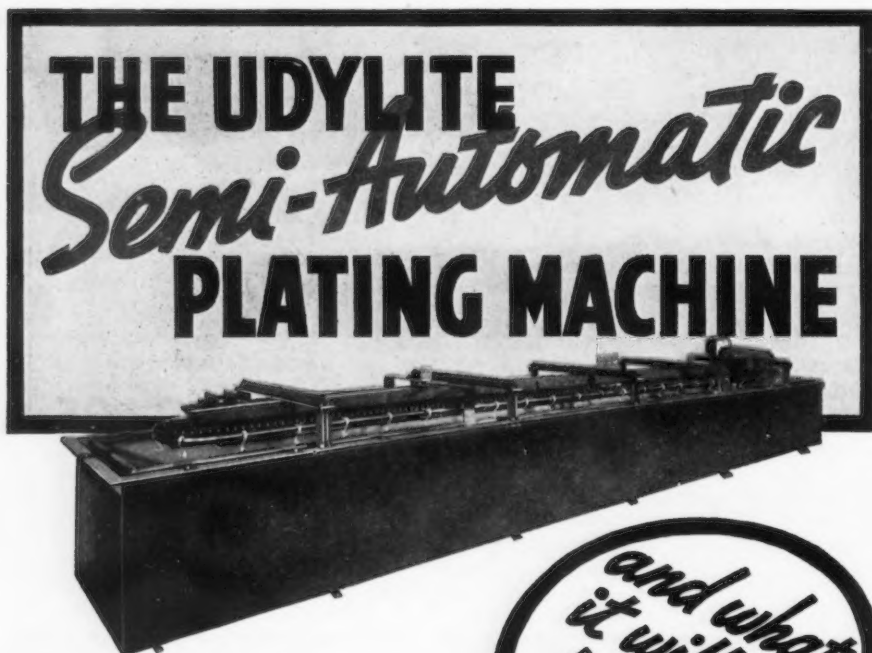
First word of the strike came when Mr. Murray released a statement that no agreement had been reached and that the company's plants would be struck at 11 p. m., May 12. According to SWOC, one reason for the union rejecting the company's offers was the fear that the election offered would not take place for some time because of red tape, petitions, etc. There is also a strong possibility that union officials were unable to hold their men at work, as a strike deadline had been built up beginning three days before the actual shutdown took place. However, after the strike began, negotiations were resumed, attended by the steel company and union heads and Mr. Dewey of the United States Department of Labor, at which the details of the settlement were begun. Within a short time after the final agreements were reached, word was passed to the workers and the plant resumed operations approximately 36 hr. after having closed down.

It is interesting to note that the same company whose case before the NLRB led to the Supreme Court decision sustaining the constitutionality of the National Labor Relations Act, was the first major steel company which offered as a solution of its labor troubles, a Government supervised election.

#### Text of Agreement

The text of the agreement between the union and the steel company follows:

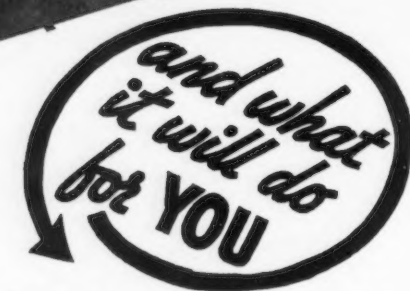
"1. The strike shall be called off



**T**HE Udylite Semi-Automatic Plating Machine is a unit designed to produce better plated work at lower cost through close production control, elimination of rejects and labor saving.

The machine is a sturdy, durable unit built to operate continuously with a minimum of maintenance expense. In the construction are combined great strength and smooth, efficient operation.

A wide variety of sizes are available to handle any plating requirement. The Udylite engineer will be glad to investigate your plating problem and recommend the size best suited to your needs. Write to the nearest Udylite office for full details.



- 1 Produces Uniform Deposits.** Just like "peas in a pod," every piece is uniformly plated as it is subjected to identical plating conditions. Plating time . . . current density . . . these and other important plating factors are the same for each part.
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- 3 Saves Labor.** With the Udylite Semi-Automatic, two men can do the work of five or six with the ordinary still tanks.
- 4 Chain Does the Walking.** The operator of the Semi-Automatic works in one spot loading and unloading the machine. Instead of walking to and fro, he simply loads the conveyor and the chain actually does the walking. The time saved in lost motion between still tanks alone is sufficient reason why semi-automatic machinery should be given full consideration.

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immediately as soon as arrangements can be accomplished.

"2. All employees as of May 12, 1937, will be returned to their former positions in the mills of the corporation without discrimination.

"3. Pending completion of arrangements to be entered into between the corporation, the Steel Workers Organizing Committee and the National Labor Relations Board for a consent election under Government supervision to determine what agency a majority of the workers desire to represent them for collective bargaining purposes, the corporation guarantees that no one identified with it in a supervisory capacity or ineligible to vote will in any way interfere with, coerce or restrain any of its employees in the exercise of the right of self-organization guaranteed by the National Labor Relations Act.

"4. The corporation agrees that it will cooperate fully with the National Labor Relations Board in the preparations for holding a consent election by placing such payroll data as may be necessary at the disposal of the National Labor Relations Board in order to determine the eligibility of employees to vote and to facilitate the holding of a Government supervised election not later than May 20, 1937.

"5. The corporation further agrees that pending the final determination of said election, it will carry out and respect the same terms and conditions of the standard agreement now in effect between the Carnegie-Illinois Steel Corp. and the Steel Workers Organizing Committee until a majority of the employees participating in said election have indicated their desire with regard to the agency to represent them for collective bargaining purposes.

"6. The corporation agrees to negotiate and sign an exclusive bargaining contract with the Steel Workers Organizing Committee in the event a majority of those participating in the election select the Steel Workers Organizing Committee as their collective bargaining agency."

## Nash to Modernize; Spends \$1,500,000

NASH-KELVINATOR CORP. announces that it will spend approximately \$1,500,000 for modernization in the Nash motor plants at Kenosha, Racine and Milwaukee.

## Porcelain Enamellers Discuss Their Shop Problems in Forum

THE Porcelain Enamel Institute's forum, held May 5 to 7, at the University of Illinois marked a new high point with attendance at 215 and a reported gain in company membership, which now represents 85 per cent of the industry's volume. It was decided

to continue this new forum plan holding alternate meetings at Ohio State University and the University of Illinois. The meeting, as conducted this year, was in fact a new project which supplants the form taken by previous forums and the short courses for porcelain



**THE PLACE TO BUY  
HEAVY FORGINGS**

Standard is a prompt source of supply for heavy forgings whether they be relatively simple like this 5,600 lb. forged ball drop or more complex like the 14,300 lb. forged crankshaft pictured here.

Standard's forgings and castings, too, are made from open hearth steel produced under close metallurgical control in our own furnaces.

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# STANDARD

enamellers. It was proposed that "internships" be created for ceramic students who desire to affiliate with plants in the industry.

Requirements of porcelain enamel for architectural work were discussed by Milton Gallup, Enamel Products Co., Cleveland. He disclosed that the introduction of architectural material into the porcelain enameling plant has actually introduced no new problems to either the fabricating or enameling departments. Architectural materials have merely offered more of the same old problems. Actually, the individual pieces are no more difficult to produce than many of the requirements for stove parts, parlor heaters or refrigerators and not half as bad as some of the pieces that scale manufacturers, for example, have requested. Up

to date, however, in the architectural field the situation is that the variety has been great and the quantity for any one piece has been so limited that it has made it impractical properly to tool up for sensible production.

Experience teaches that there are only a few essential requirements necessary on any architectural job to insure satisfaction to the customer. Area of a given panel should not be more than 24 in. wide by 36 in. long. This is not always possible but it is certainly a desirable end to work toward. Large, cumbersome pieces are difficult and costly to fabricate and likewise are awkward to handle in the furnace. Panels with offset angles and flanges usually come out buckled and wavy and create a bad appearance.

The piece must not be too fragile so that it will chip when it is cooled after burning, or when it is being packed, or when it is being shipped, or when sheet metal erectors toss it around before putting it on a building. Another consideration in the design which will come up more and more is the matter of size of curved panels which must be designed so that they can stand a certain amount of warpage and yet be pulled into position at time of erection. Best results can only be produced in curved panels by use of radius dies. Hand formed and welded parts are distorted and irregular before the enameling is done and are worse after.

#### Enameling of Castings

Common troubles experienced in enameling castings were treated in a paper by M. L. Carl, Sloss-Sheffield Steel & Iron Co., Birmingham. The subject covers three main divisions; namely, iron composition, casting surface and casting design.

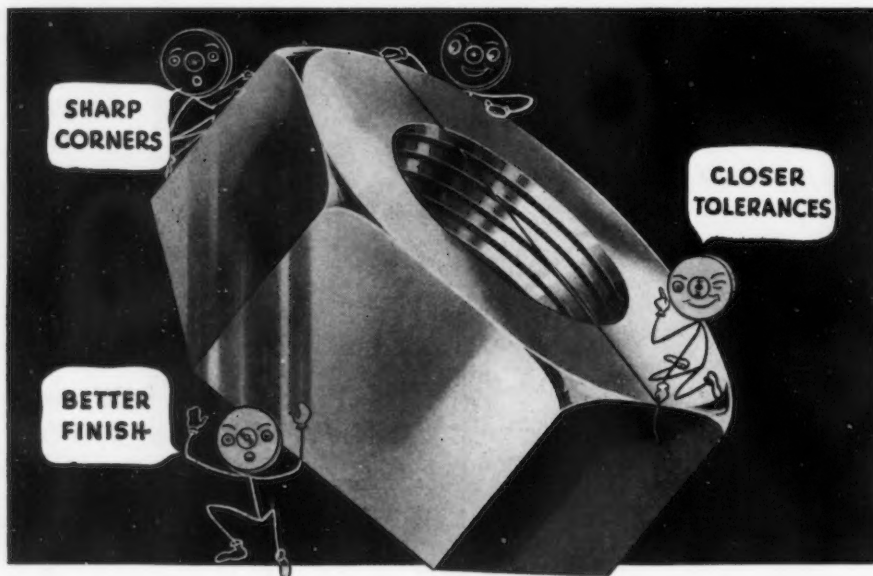
Actually a wide variety of analyses of iron is being successfully enameled. However, it must be realized that to be able to enamel these various analyses, other conditions must vary as the composition of the iron varies. A casting of one analysis, to enamel well, requires expert molding, sand control and practically perfect patterns, while a casting of another analysis, may enamel equally well when cast in a sand receiving less attention and from a pattern of a poorer design.

The enamel plant should be supplied with castings of a reasonable analysis, and castings of a consistently uniform analysis. For a foundry to produce castings of a uniform analysis, it is most desirable that the cupola charges be small, the iron melted hot and mixed in a mixing ladle holding at least the equivalent of one iron charge.

The surface of the casting probably causes the enameler more worry than either the composition or design, for it is here that most of the enamel troubles develop, often indirectly due to composition or design, or both. The enameler wants a casting that expands equally in its various parts, or expands in such a manner as not to develop undue strains while being fired. To be able to do this, it is necessary that the casting absorb the heat in proportion to its varying metal thicknesses.

Blistering is probably responsible for the majority of troubles in the enamel plant. Some of the things that can cause it are;

- (a) The iron and scrap used in the cupola charges.



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**CARBOLOY** DRAWING AND EXTRUSION DIES

- (b) The melting practice.
- (c) The handling of the iron from the cupola to the molds.
- (d) The condition of the molding sand.
- (e) The kind and amount of facing used on the molds.
- (f) The design of the casting.

The proportion of pig iron and scrap in the cupola charge may vary in different foundries, from 65 per cent pig iron and 35 per cent of the foundries own scrap, gates, sprues, etc., to 25 per cent pig iron and 75 per cent bought and own scrap. Regardless of the proportions used, the iron should be of the proper size and analysis. Large and heavy pieces of scrap are to be avoided, since they are not completely melted until they have gotten dangerously low in the coke bed and tend to make an iron of a lower temperature and of non-uniform analysis. Burned scrap and scrap containing any appreciable amount of steel or alloys, are not desired, for with a normal melting practice, these will cause a lack of fluidity, so necessary in making the majority of castings to be enameled.

Sound castings may be made with many analyses of iron, but to control the surface chill as cast, and the combined carbon as desired, narrows the analysis down to a comparatively limited range, especially for castings of thin sections. Other conditions, such as melting practice, molding and molding sand being normal, the following range of analysis has been found to be favorable for making light castings to be enameled:

Si . . . . . 2.45 to 2.55	S . . . . . .06 to .10
Mn . . . . . .40 to .50	P . . . . . .75 to .85
T.C. . . . . 3.35 to 3.50	C.C. . . . . .25 to .40

If the melting practice is extremely good, many difficulties in molding and enameling may be avoided, although the type iron being charged into the cupola may not be of the highest quality; on the other hand, a poor melting practice can easily ruin the best of irons for castings which require enameling. Poor melting practice generally results in an iron which, when cast, produces a deep surface chill and high combined carbon. This is true when insufficient coke is used or heavy scrap is charged, causing the iron to melt too near the top of the tuyeres; the iron coming from the cupola at a lower temperature than desired, or if plenty hot at the cupola, it will lack fluidity due to the higher temperature at which it will solidify.

Just the reverse of this condition may also be called poor melting practice, when too much coke is

used, allowing the iron to become practically saturated with carbon, thus making an iron which may be extremely hot at the cupola spout but is sluggish before it can be poured into the mold. Should there be any doubt about which of these two conditions exists, a chemical analysis of the iron for total carbon will tell the story.

Good iron can be ruined for enameling purposes by handling it in ladles not absolutely dry, and many times the practice of chilling the iron in the ladles, by adding pieces of scrap, results in castings of poor enameling qualities.

#### Condition of Sand

Condition of the molding sand has been responsible for more enameling troubles originating in

the foundry than all other causes combined, wet molding sand being the greatest single factor. Since sand, slightly wetter than properly tempered molding sand, is easier for the molder to work, the tendency is for him to use it wet, so long as he can produce a casting which will pass the foundry inspection. This wet sand not only produces a chill on the surface of the casting, but promotes the formation of combined carbon throughout the casting, causing it to be set up in strains, and when they are enameled and annealed in the furnace, the results are blistered enamel and warped castings.

Gases formed from the moisture in a sand of low permeability, are sometimes trapped in the metal just beneath the surface of the

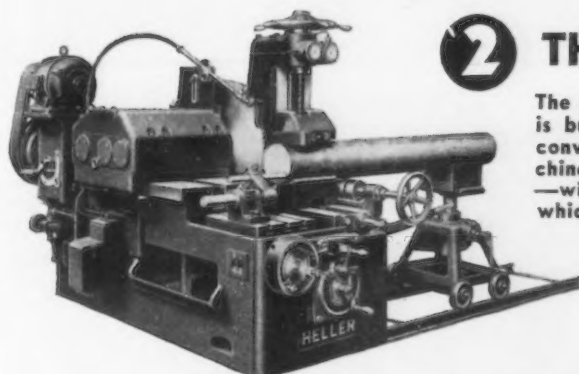
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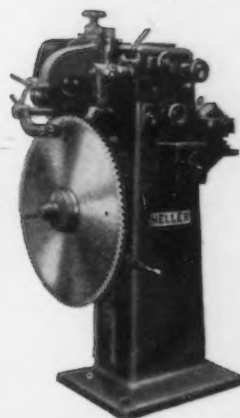
The Heller Hydraulic Cold Saw is built with the precision and convenience of a milling machine—simplified and foolproof—with feeds and blade speeds which insure maximum blade life.

3

#### THE GRINDER

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casting, and when enameled, the pin holes tell just where these little gas pockets are located.

Scarcely any mention need be made of the sand holes which are visible after the casting has been blasted and must be filled before being enameled. Sand holes may be attributed to many causes, but usually may be summed up by saying they are due to carelessness or improper sand control.

Seldom ever does slag from the iron enter the mold if the ladles have been skimmed. About 99 per cent of this slag is made right in the mold by hot iron washing and fusing loose silt from the sand in the gate, sprue or runner, thus forming a silica slag. When a fine grain molding sand has not had sufficient new sand containing enough clay added to hold this slit, it is not unusual to get these slag

spots in castings. Iron melted on a low coke bed or iron handled in ladles not properly dried, seems to cause a greater cutting action of the sand at the gates, than an iron properly melted.

The permeability, compression strength and moisture content of the sands should be carefully controlled, particularly the moisture, which should be kept near the minimum workable amount, and to do this, it is necessary to control the percentage of silt.

For some time, practically all facings were condemned by some foundries as being harmful in making castings to be enameled. However, such is not the case. There are two dust-on facings in the market, both of which are free of graphite, and neither requires the usual tooling or slicking, but adheres to the mold face when dusted on in small quantities. The use of these facings in proper amounts, and when correctly applied, is recommended. When using these facings, it should be remembered not to use parting material on the drag face of the mold, or, if necessary, not more than the very minimum amount, since parting interferes with the adherence of the facing to the sand.

The design of the casting to be enameled, should be such that it lends itself to an even, smooth coat of enamel, therefore, sharp edges or corners, beads, grooves and lugs are to be avoided. A proportioning of the metal to form a casting which will not develop strains when heated, is desired.

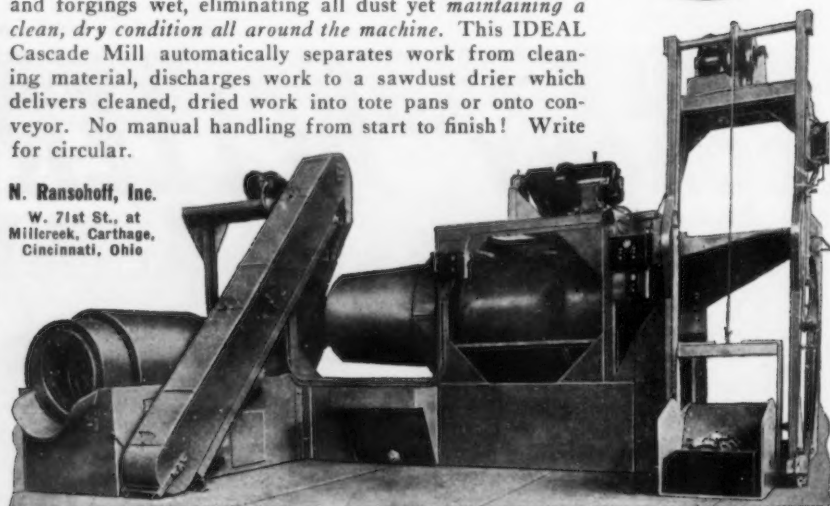
It is obvious that sharp edges are hard to cover, the grooves fill with enamel, and that it is a hard problem to get a satisfactory covering over beading of any height. A uniform metal thickness is generally desirable, but this is not necessarily true in all cases. If a casting having flanges turned down around its four sides with a panel or smooth section in the center area, such as a door which covers the ash and fire door on some stoves, is of even thickness throughout, it is likely that the panel section of the casting will absorb heat faster than the areas having more metal, and will warp before the enamel has started fusing, causing cracks in the dry enamel which results in hair lines. When the panel section is increased in thickness slightly, the heat will be absorbed at about the same rate as the outer sections, eliminating this trouble.

## Dustless Cleaning

Something  
NEW!

At last—a simple, effective method of cleaning castings and forgings wet, eliminating all dust yet *maintaining a clean, dry condition all around the machine.* This IDEAL Cascade Mill automatically separates work from cleaning material, discharges work to a sawdust drier which delivers cleaned, dried work into tote pans or onto conveyor. No manual handling from start to finish! Write for circular.

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## Steel Is Prominent as a Building Material at Homes Exposition

THAT steel has become a major factor in home construction is readily apparent as one strolls through the North American Homes Exposition at Madison Square Garden, New York. Not only is it exhibited as a framing medium, but also as a material from which to make window frames, kitchen sinks and cabinets, refrigerators, stoves, insulation, tile, awnings, and as a decorative trim.

The most prominent exhibit is that of the Bethlehem Steel Corp., which has set up a model structure displaying two methods of using steel in the framework of small homes. The first of these makes use for framing of solid-web joists and stanchions, weighing 7½ lb. to the foot, spaced in 4-ft. sections, and supporting a 2½-in. reinforced concrete slab, on top of which regular flooring is laid. The second house model shows open-web joists and studs, the flooring in this case consisting of a 2-in. slab, unreinforced, laid over metal lath, and spaced in 2½-ft. sections. In the former instance, the steel is engineered in the office and bolted together in the frame, while in the latter case, the lighter steel is cut and fit to size at the job, and is all-welded. Carpenters can erect either frame.

Of the two displays, that featuring the light open-web construction drew the greatest crowds, while the heavier I-beam style proved less attractive. Company representatives stated that the latter was mainly included for those builders who from its appearance regarded the light steel as too fragile and not sufficiently strong for their needs.

Various types of insulation are exhibited, any one of which can be used. These included steel lath, gypsum board, steel-tex, Ecod fabric, and celotex. A new development made necessary by the steel studs is lath clips and specially constructed nails for attaching the lath boards to the studs.

Bethlehem claims its steel framed homes are fire resistant, termite proof and shrinkage free. The cost is from 5 to 10 per cent greater than that of an ordinary wooden structure, and the steel framework weighs about half as much as would be required by a wood framework. The increase in cost is believed to be caused primarily by three factors: The concrete sub-floor; spacing of 30 in.

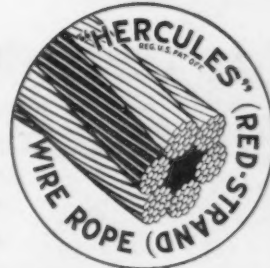
of the studs as compared with the usual 16 in. which makes rib lath necessary instead of drum lath, the former being slightly more expensive; and an outside wall liner behind the brick wall for an insulating medium.

Bethlehem's greatest activity thus far in this field has been around Philadelphia, but the idea is to be developed much more extensively, and the exhibit in New York is intended to attract attention in the metropolitan area.

Monel metal sinks and 18 and 20 gage sheet steel cabinets for the kitchen are on display by the Whitehead Metal Products Co. The cost of adding such equipment to a kitchen is estimated at 10

### Results Are What Count

If you want real economy—look to results rather than to first cost. It is on this basis that "HERCULES" (Red-Strand) Wire Rope continues to make and hold friends. There are reasons, of course, why this wire rope is so dependable and long lasting, and we are always glad to give full details to everyone interested in saving money. Made in a wide range of constructions including Round Strand, Flattened Strand, Preformed, Non-Rotating and Steel Clad types.



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**LINDERME MACHINE & TOOL COMPANY, 12251 Coyle Avenue, Detroit, Michigan**

per cent more than that of better grade wood. A representative of the company stated that monthly sales were averaging about \$200,000.

An interesting development of metal for insulation purposes is being shown by the American Flange & Mfg. Co., Inc., Chicago, which makes use of the principle that metal radiates or reflects about 95 per cent of the heat that strikes it, the product being known as Ferro-Therm. Made of

light gage black commercial steel, which is hot-dipped in an alloy of lead and tin, a smooth dull surface results which reflects heat because of its molecular construction and not because of its polished surface. Installation is simple and a carpenter is said to be able to install from 600 to 800 sq. ft. a day in an ordinary frame house.

Fenestra Steel Windows Co. has developed what is known as the air conditioning window, it being so designed that the entire inner

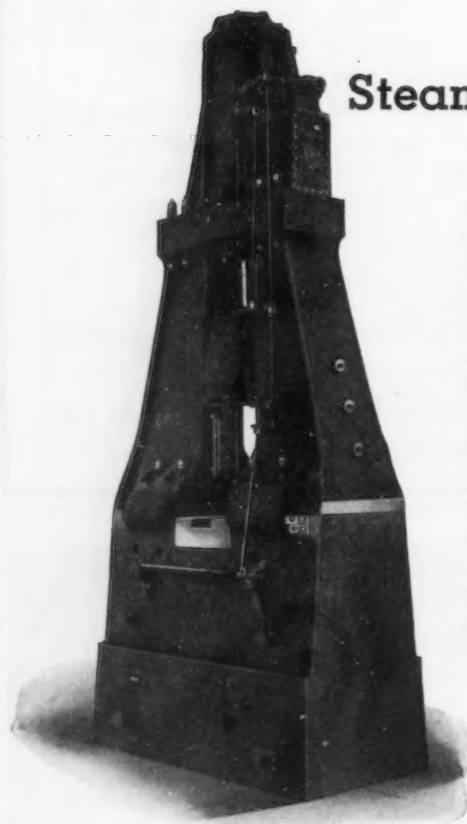
surface of the steel casement frame can be covered with glass, leaving an air space of one inch between that and the regular outer surfaces.

Metal awnings are shown by the Sunvent Metal Awning Co., New York, and stainless steel models are available.

The Murphy Door Bed Co., New York, has on display vitreous enamel kitchen equipment, which includes a combination of sink, range and oven, refrigerator, and cabinets, in as small a size as 48 in. wide.

"The House of Tomorrow," a futuristic home sponsored by *The Ladies Home Journal*, includes stainless steel for trim, Monel metal and steel cabinets in the kitchen, Ferro-Therm metal insulation, General Electric equipment, Crane plumbing, and W. & J. Sloane furniture.

## For Cranks on the Subject of Cranks— ERIE Steam Drop Hammers



In the shops that turn out more crank shafts in a day than most shops do in a month, Erie Steam Drop Hammers, like the one illustrated, do the work. All of the "Big Three"—volume producers of automobiles—use Erie steam drops. All of them who forge crank shafts use hammers of this particular type, with rigid extended frame construction, heavy forged tie plate, quadruple-ported-valve cylinder. The hammers that have proven best for this tough job are best for your work.

*\*A 12,000 lb. Erie steam drop recently installed by a prominent automobile manufacturer for forging six-throw crank shafts is shown in the illustration.*

*\*A second duplicate hammer, and then a third, ordered by this manufacturer since this advertisement was first printed.*

**ERIE FOUNDRY COMPANY, ERIE, PENNA., U. S. A.**

DETROIT:  
CHICAGO:  
INDIANAPOLIS:

335 CURTIS BLDG.  
549 WASHINGTON BLVD.  
335 POSTAL STATION BLDG.

CANADA: JOHN BERTRAM & SONS CO., LTD.  
FRANCE: FENWICK, S. A.  
ENGLAND: BURTON, GRIFFITHS & CO., LTD.



## Plants Must "Spot" Cars at Own Expense

WASHINGTON, May 18.—Industries will have to "spot" cars at their own expense. This is the effect of a decision of the United States Supreme Court yesterday. The opinion upholds orders of the Interstate Commerce Commission which required carriers to discontinue delivering cars without cost to specific points in industrial plants and also to stop making allowances to industrial railroads for spotting cars. Many steel companies perform their own intra-plant car service. The commission order was held up temporarily by an injunction issued by the West Virginia Federal District Court when attacked by the Pittsburgh Glass Co. Upon appeal by the Government, the order was approved by the Supreme Court.

## Lewis Mill Sold to British Company

LEWIS FOUNDRY & MACHINE CO., a subsidiary of the Blaw-Knox Co., has been awarded a contract by Dorman Long & Co. of Middlesborough, England, for a completely mechanized three-high mill. This mill will have electric motor driven screw down, automatic pre-set control, electric middle roll balance, and Lewis roller and catcher tables. The order was placed through Canada Iron Foundries, Ltd., which handles sales in Great Britain for Lewis Foundry & Machine Co.

## FTC Contemplates Cease and Desist Order Against Basing Point System

**W**ASHINGTON, May 18.—The Federal Trade Commission is considering whether to reopen its study regarding identical steel bidding. To this end it has arranged for an early conference with Attorney General Homer S. Cummings or his representative to get the advice of the Department of Justice. If the commission does act, it is reported that it may contemplate, if it feels it has the authority, the issuance of a sweeping cease and desist order against the basing point system in the steel industry.

The commission now has pending a complaint directed against the Birmingham-plus system used by cast iron soil pipe makers. It was stated recently that the commission proposed to rely on this case to attack all basing point systems. Now, however, indications are that, dependent upon advice given by the Department of Justice, it may consider it necessary to go beyond the Birmingham-plus case, since it involves only a single basing point and proceed separately against the multiple basing point system as used in the steel industry. However, in its report to the President on June 10, 1936, on identical bidding, which covered quotations on steel sheet piling, the commission said that the basing point system "on steel sheet piling is in essence a single basing point system over large areas." For this reason, the commission may, it is said, confine any action it may take to steel sheet piling, though the impression given is that it would be much wider in scope.

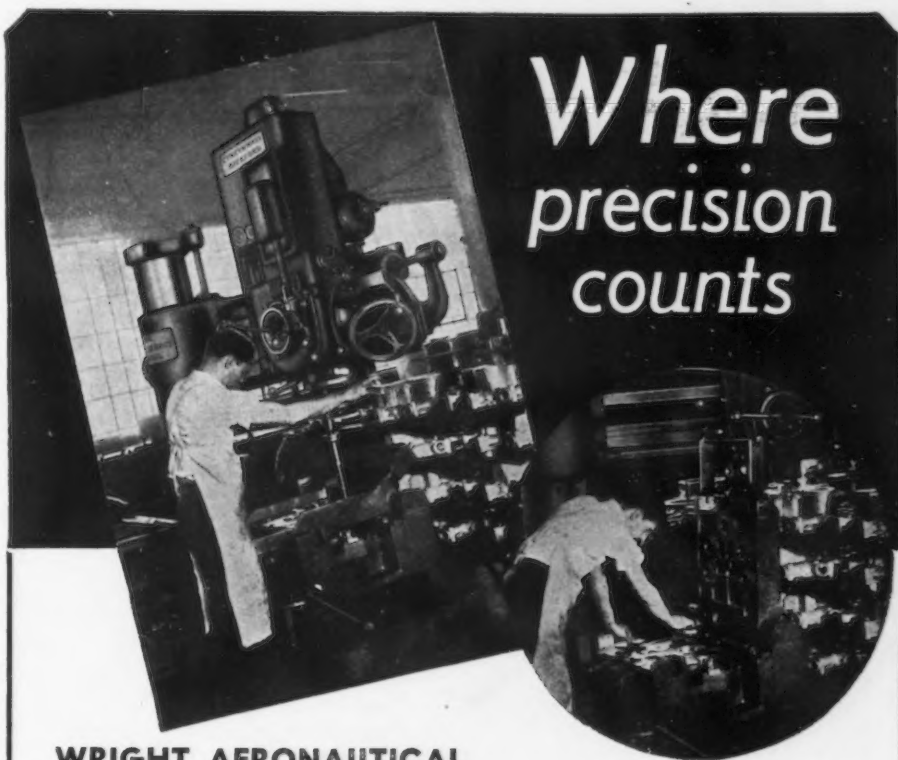
The question has been taken up again by the Federal Trade Commission because it was passed back to it by the Attorney General in his report on identical bidding April 26 to the President. The Attorney General said that "the identical bids in the steel industry are produced, in part, by the basing point system of price determination." He proceeded to say that, "The machinery of the courts is not geared to the handling of the social and economic factors involved" and that therefore "a problem is presented which can be more satisfactorily investigated and dealt with through the more flexible remedies of the Federal Trade Commission." The preliminary text of the Attorney General's report referred to control of the Federal Trade Commission "by way of a cease and desist order." But he said subsequently

that "the present machinery of enforcement through the Federal Trade Commission also should be made more adequate and effective and the devitalizing effect of some of the court interpretations upon its powers should be overcome by legislation."

It is assumed the Federal Trade

Commission wants to know just what power, if any, it has to reopen the case and if it is reopened, how far it should go or whether the case should be dropped pending further legislation.

In its report to the President on identical bidding the Federal Trade Commission held that there was "reasonable ground to believe that the anti-trust laws have been violated" and recommended Department of Justice action. The Department of Justice passed the case back to the Trade Commission.



**Where  
precision  
counts**

**WRIGHT AERONAUTICAL**

**insures accuracy . . . with a  
SUPER-SERVICE RADIAL**

• For 7 years this Super-Service Radial has produced fast and accurate work in the plant of the WRIGHT AERONAUTICAL CORPORATION, Paterson, N. J. The job being handled is a rear accessory section of cast magnesium alloy for the 1000 H.P. WRIGHT Cyclone Engine.

Centralized control in the head—rapid power traverse—long spindle sleeve bearing at the bottom of the head—herringbone gears for the slow speed spindle drive—provide an ability to take heavy cuts without chatter and are just a few of the reasons why Super-Service Radials produce accurately and at low cost.

Write for catalogs giving complete information.

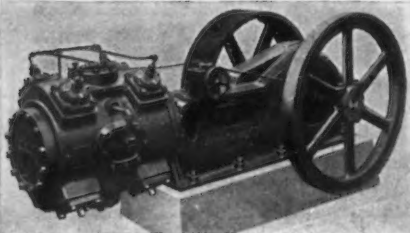
**CINCINNATI BICKFORD TOOL CO., OAKLEY, CINCINNATI, OHIO**

**CINCINNATI BICKFORD**

# WORTHINGTON



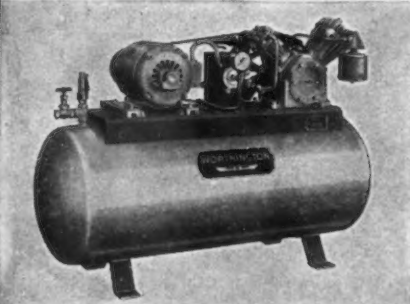
## AIR COMPRESSORS for every requirement



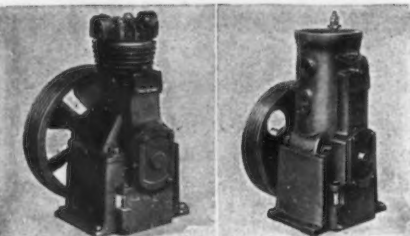
**SINGLE-CYLINDER HORIZONTAL COMPRESSORS**  
Capacities to 2042 cu. ft.; Pressures to 150 lb.



**THREE-CYLINDER AND SIX-CYLINDER ANGLE COMPRESSORS**  
Capacities to 445 cu. ft.; Pressures to 125 lb.



**TWO-CYLINDER ANGLE COMPRESSORS**  
Capacities to 45 cu. ft.; Pressures to 200 lb.



**SINGLE-CYLINDER VERTICAL COMPRESSORS**  
Air-Cooled and Water-Cooled  
Capacities to 67 cu. ft.; Pressures to 250 lb.

THESE units are representative of a complete line...from which the proper selection to meet any individual condition can be made...without prejudice or compromise.

• Literature on request

WORTHINGTON PUMP AND MACHINERY CORPORATION  
General Offices: HARRISON, NEW JERSEY  
Offices and Representatives in Principal Cities throughout the World

## PERSONALS

(CONTINUED FROM PAGE 64)

WILLIAM A. IRVIN, president, United States Steel Corp., will be guest of honor and chief speaker at the formal ground breaking ceremonies May 22 at the site of Carnegie-Illinois Steel Corp.'s new sheet and strip mill, named the Irvin works in his honor. Mr. Irvin will turn the first earth with a spade fabricated of stainless steel and will be introduced by B. F. Fairless, president, Carnegie-Illinois.

S. D. MAHAN has been appointed general advertising manager of the Westinghouse Electric & Mfg. Co., with headquarters in Mansfield, Ohio. Formerly manager of merchandising advertising, Mr. Mahan will now have general supervision over all advertising and sales promotion work of Westinghouse and its subsidiary companies.

Mr. Mahan is a graduate of Edinboro State Teachers' College and has been directing advertising and sales promotion activities in advertising agencies and industrial concerns for more than 20 years. He was first associated with the H. K. McCann Co., Cleveland, and while with this agency spent four years in Toronto, Ont. In 1924 he returned to Cleveland with the Roger Williams Co. He then joined the advertising agency of Fuller, Smith & Ross, where he was vice-president and general manager of the Cleveland office. Later he became vice-president of the Greenleaf Advertising Agency in Boston, which post he left in 1933 to become merchandising advertising manager of Westinghouse.

ROGER BOLIN has been appointed merchandising advertising manager of the Westinghouse Electric & Mfg. Co., succeeding Mr. Mahan. Mr. Bolin will make his headquarters in Mansfield where Westinghouse merchandising operations are centered. He joined the Westinghouse organization in 1925 at East Pittsburgh and since that time has been continuously associated with merchandising advertising and sales promotion activities of the company.

O. W. YOUNG, who only two weeks ago was made assistant manager of manufacturing for the Buick Motor Co., has been made general manufacturing manager, succeeding the late Charles T. Scannell. He advances to the head of all Buick manufacturing operations after three years as general superintendent and more than 30

years in the Buick organization, in which he started as a lathe hand.

WILLIAM A. MARSHALL has been appointed superintendent of construction for Irvin works of Carnegie-Illinois Steel Corp. He is a graduate of the Pennsylvania State College and was resident engineer at Vandergrift works from March, 1935, until his present appointment. Prior to that time he was successively assistant master mechanic and master mechanic at Farrell works and from Aug. 1, 1932, to Feb. 28, 1935, master mechanic at Farrell-Mercer works.

WILLIAM G. HULBERT, formerly superintendent of the Easton plant of Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has been appointed general works manager in charge of manufacturing at both the Easton, Pa., and High Bridge, N. J., plants. H. F. HEYL, formerly chief engineer at the Easton plant, succeeds Mr. Hulbert as superintendent at Easton.

B. W. NORTON has been appointed assistant manager, Youngstown district, Republic Steel Corp., by R. L. LEVENTRY, who was recently appointed manager of that district. Mr. Norton has been superintendent of the Youngstown district blast furnaces and coke plant since 1933 and had been with Republic and its predecessors in the coke plant and blast furnaces since 1925. F. C. FARRELL has been appointed assistant district manager of the Republic plants in the Warren-Niles district, his appointment following the recent naming of FRANK E. FLYNN as district manager in the Warren-Niles district. Mr. Farrell has been affiliated with the iron and steel industry since 1903 and has had a wide range of experience in steel making operations throughout the Youngstown-Warren district.

WALTER A. BONITZ, president, Pressed Steel Car Co., Inc., Pittsburgh, has resigned, owing to ill health, but will remain on the board of directors. Mr. Bonitz was one of the receivers and trustees in the reorganization proceedings of Pressed Steel Car Co. of New Jersey and at the termination of these negotiations was asked to serve as president of the reorganized company. With the company now functioning completely, Mr. Bonitz felt that his health would not permit his continuing as head of the company.

## Machine Tool Show Held by G-E

**M**OTORS and control devices and accessories designed for machine tool application were discussed in detail at the Machine Tool Speed Show held by the General Electric Co. May 17 at the Hotel Bancroft, Worcester, Mass. The meeting comprised two formal sessions with six addresses, a luncheon and a dinner meeting. Total attendance was in excess of 200.

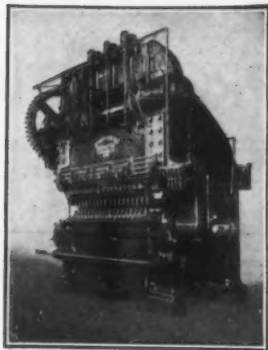
The keynote of meetings was the role of modern electric equipment in helping machine tool builders meet the demand for higher speeds and greater accuracies. How available motors controls and accessories aid the machine tool builder in meeting requirements relating to ease of operation, greater capacity, low maintenance and low overall costs was part of the highly informative data presented by the various speakers. Several items of electrical equipment described were entirely new and, in addition to lantern slide illustrations, these and other devices were exhibited and demonstrated during the meeting.

Sessions were under the general chairmanship of S. W. Corbin, manager of sales, machinery manufacturers section, Schenectady; T. S. Knight, commercial vice-president of General Electric and New England district manager made an address of welcome. Papers and their authors were: "High Production Performance with Carboly Tools," by A. A. Merry, Carboly Co., Detroit; "Requirements of Electric Equipment for High Production Machine Tool Performance," by A. C. Danekind, general manufacturing department; "Meeting Your Requirements for Motors," by R. S. Walsh, motor division; and "Industrial Control to Meet Modern Machine Tool Standards," by N. L. Hadley, industrial control section. "How Application Engineering of Electric Apparatus Can Help You Get Speed With Accuracy" was the title of a paper by W. R. King, machinery manufacturing section. At the same session J. D. Wright, assistant manager industrial department, discussed the advantages of using standard rather than special motors.

C. R. Burt, president Niles-Bement-Pond Co., and Prof. H. E. Edgerton, Massachusetts Institute of Technology, were the principal speakers at the banquet.

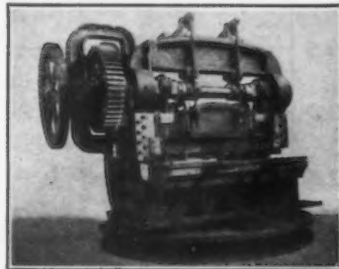
A similar meeting will be held at Cincinnati May 24 and at Rockford, Ill., May 28.

PUNCHES • SHEARS • SPACING TABLES



### Plate Shears

Another Thomas fabricating tool that has built a reputation for Thomas design!



# THOMAS

SPACING MACHINE CO.

PITTSBURGH, PA.

FABRICATING MACHINERY

PRESSES • DIES • METAL-FORMING MACHINERY

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

*New 13oz.* **WELDIT**  
MODEL W  
**WELDING TORCH**  
*with BUILT-IN Automatic GAS AVER*

**SAVES** fuel—reduces welding cost—eliminates idle flame hazards. As operator grasps handle of torch placing thumb on lever in natural position, full welding flame is instantly on. Release thumb, and automatically flame is reduced to pilot size. No re-lighting or re-adjusting flame between welds. Weighs only 13 ounces, no mechanism in handle, fuel control valves are conveniently located in front of torch handle. Actual savings will soon pay for torch.

Literature on request.

**WELDIT ACETYLENE CO.**  
641 BAGLEY AVE. DETROIT, MICH.

Test this **WELDING TORCH** ★ *Free* ★ FOR TWO WEEKS IN YOUR PLANT

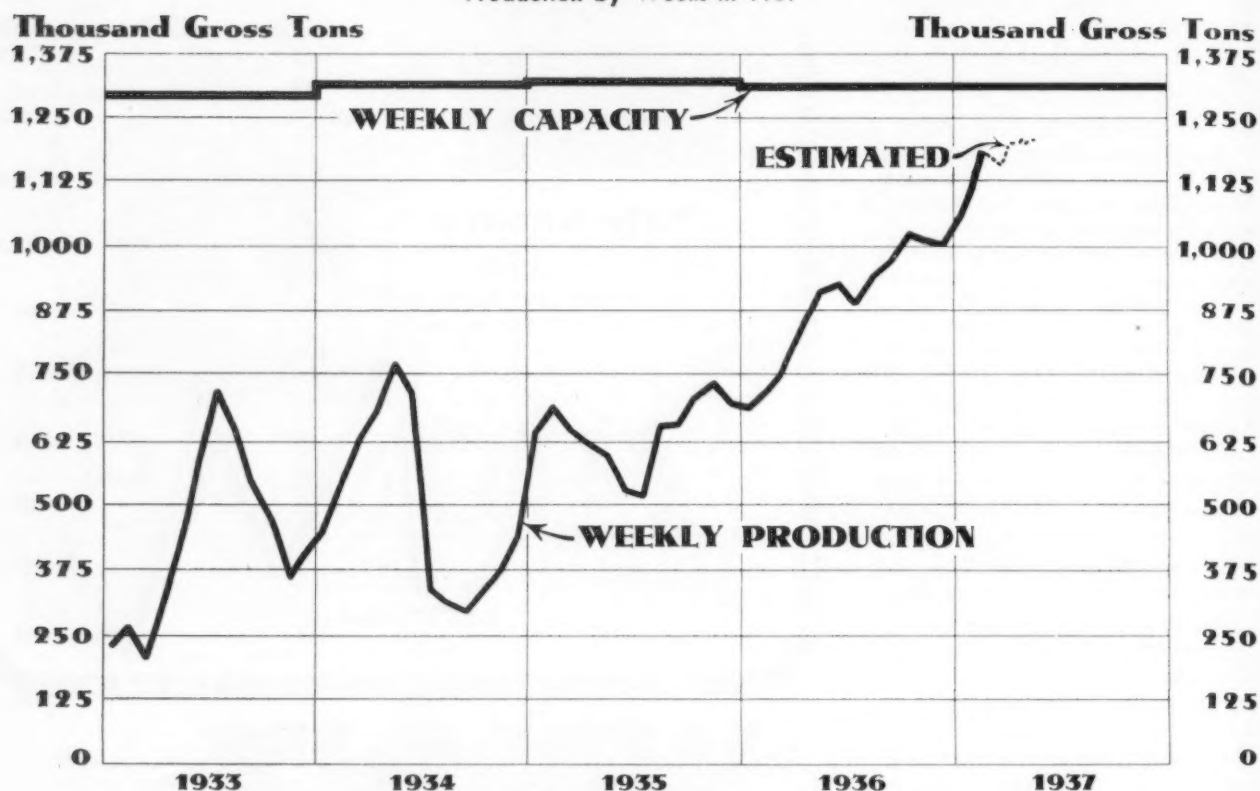
Automatic LEVER CONTROL GAS AVER

Automatically ON IN USE

Automatically OFF NOT IN USE

# PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

## STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week
Pittsburgh .....	95.0	85.0*
Chicago .....	86.0	86.0
Valleys .....	86.0	87.0
Philadelphia .....	71.0	71.0
Cleveland .....	87.0	88.0
Buffalo .....	86.0	91.0
Wheeling .....	99.0	98.0
Southern .....	75.0	75.0
Ohio River .....	90.0	92.0
Western .....	95.0	95.0
St. Louis .....	90.0	90.0
Detroit .....	100.0	100.0
Eastern .....	98.0	90.0
Aggregate .....	92.0	90.5*

\*Revised.

## Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	May 18, 1937	May 11, 1937	April 20, 1937	May 19, 1936	1937	1936
Fabricated structural steel awards.....	16,700	15,970	14,200	34,720	480,815	417,750
Fabricated plate awards.....	320	315	2,170	1,940	57,415	124,130
Steel sheet piling awards.....	0	0	450	1,275	16,530	16,975
Reinforcing bar awards.....	1,410	16,415	4,045	4,800	84,870	150,720
Total Lettings of Construction Steel....	18,430	32,700	20,865	42,735	639,630	709,575

## ...SUMMARY OF THE WEEK...

*... Strike threat the only serious blot on steel industry's prospects.*

° ° °

*... Business lighter in some directions, but improves elsewhere.*

° ° °

*... Production at 92 per cent; steel scrap composite back to year's low point.*

EXCEPT for threats of strikes that might tie up some independent steel plants, the steel outlook is viewed more hopefully than was possible a few weeks ago, when new business volume began to decline. The drop in new business has not been precipitate, sales of most of the major producers having been around 75 per cent of shipments so far this month. In some products, notably plates for railroad equipment and pipe lines, new business of substantial amount has been placed, with considerable construction steel in early prospect. Thus, it now appears that a good portion of existing backlogs will be carried over into the third quarter, which will help to sustain operations at a high rate at least through July.

Strike threats against three or four independent companies have appeared more realistic in view of the two-day shutdown last week at the Jones & Laughlin Steel Corp. plants in Pittsburgh, and have caused some buyers to urge mills to hasten shipments, particularly sheets. No drastic action by the Steel Workers Organizing Committee is expected until after the result of the balloting on May 20 by employees of Jones & Laughlin is announced.

With the resumption of operations by Jones & Laughlin at the rate in effect previous to the strike, the industry is estimated to be producing ingots this week at 92 per cent of capacity. The Pittsburgh rate has jumped to 95 per cent, the highest of the recovery period, against a revised figure of 85 per cent for last week. The Wheeling district is operating at 99 per cent. The Chicago district continues at 86 per cent, but a large volume of new business there may force an early

increase. There have been one-point declines in the Ohio Valleys and at Cleveland, but elsewhere previous schedules are being pretty generally maintained.

While the shutting down of any steel plants for more than a few days would tighten up the steel delivery situation, which has become quite a bit easier, the mere possibility of such strikes has tended to depress steel scrap prices still further, as many large consumers stay out of the market. However, a decline of \$1 a ton at Pittsburgh is based on a good-sized sale to a mill. There have also been declines of \$1 at Philadelphia and 50c. at Chicago, reducing THE IRON AGE steel scrap composite to \$17.92, or back to the low point of the year on Jan. 4, last.

THE Chicago territory, which affords a good cross-section of the combined requirements of the automobile industry, railroads, general manufacturing and agriculture, reports a substantial volume of new business, sufficient, in fact, to maintain backlogs at not far below their recent peaks. The A. O. Smith Corp., Milwaukee, has awarded 24,000 tons of plates for a pipe line contract, and an inquiry is out for 11,000 tons of plates for a water pipe line in New Mexico. Talk has been revived of a new gas pipe line from Texas to Chicago, which would require 225,000 tons of steel.

Railroad equipment buying may get another uplift as the carriers become convinced of the possibility of large farm crops this year. The Union Pacific orders for 3800 cars, of which 2600 will be built in its own shops, will take 42,000 tons of steel. The Burlington plans to build 2500 cars and 14 locomotives. Two companies that specialize in railroad castings are sold up well ahead, one to October and the other into 1938. A car building plant at Madison, Ill., idle for years, has been reopened to build 1000 cars.

Construction work, while lagging behind seasonal expectations, shows enough promise to encourage the trade. Structural steel lettings were about 17,000 tons, of which 3500 tons is for a bridge in Massachusetts and 1000 tons for a chemical manufacturing plant in Cincinnati. New projects of about 27,500 tons include 4500 tons for a courthouse in Philadelphia, 3000 tons for a rayon manufacturing plant at Painesville, Ohio, 2800 tons for a railway terminal in San Francisco, 2600 tons for a bridge in Oklahoma and 2000 tons for an automobile manufacturing plant at Rochester, N. Y. A bridge at Baton Rouge, La., which calls for 32,800 tons of steel, may be awarded soon.



## ...PITTSBURGH...

*... Steel output at new high of 95 per cent; 99 per cent at Wheeling.*

o o o

*... General business has settled down to a slow leveling off process.*

o o o

*... Volume is fairly satisfactory, considering heavy commitments on mill books.*

PITTSBURGH, May 18.—Owing to strike shutdowns, steel ingot output in the Pittsburgh district last week was off nine points, hence the revised figure is 85 per cent of capacity. Operations this week have reached a new recovery high at 95 per cent of capacity. Part of the improvement is due to capacity schedules by the large producer. Wheeling district is up one point to 99 per cent of capacity.

Major attention this week is centered on the election at plants of the Jones & Laughlin Steel Corp., where employees will determine by secret ballot whether they desire the Steel Workers Organizing Committee as their sole collective bargaining agency. The outcome of the election will be based on the majority of those participating.

Meanwhile, demand for finished steel products is apparently settling down to a slow leveling off process, which will undoubtedly extend through the summer months. For the first time in several months, there has been a sharp drop in specifications received for sheets, but backlogs still remain topheavy and easier deliveries on all grades except lighter gage cold rolled are not expected to materialize for some time. Considering the heavy volume of new business since the first of the year and the fact that seasonal influences are at work, the present volume of incoming business is not below expectations. Structural inquiries and awards were slightly better this past week, as were mill specifications for heavy plates and shapes. Union Pacific has ordered 3800 cars, 2600 of which will be built in their own shops, but the underframes for

these box cars will be purchased from the Ryan Car Co. Approximately 42,000 tons of steel will be needed for this project. Fresh orders for hot and cold rolled bars and strip have leveled off some this week. It is expected that deliveries will be somewhat easier in the next month or so, but so far the lightness of incoming business has been of little help at the production end of mills. Current orders are for actual and immediate requirements and this tendency is expected to continue well into the third quarter, as large consumers are apparently well taken care of owing to stocks on hand and commitments on order books.

Tin plate operations continue at 100 per cent of capacity.

No. 1 heavy melting steel is off \$1 a ton.

### **Pig Iron**

Pig iron production in the plants of two independent steel companies was affected briefly by strike shutdowns last week, but all furnaces have resumed operations. Shipments continue heavy and spot business has shown little change during the past week. Formal announcement on third quarter prices, which are not expected to show a change, should be forthcoming within a week or two.

### **Semi-Finished Steel**

Demand for semi-finished material is still heavy and specifications for skelp are exceptionally good. While total bookings in the past week for all grades of semi-finished steel are less than in the previous period, there has been little let-up in demand for sheet and tin bars.

### **Bolts, Nuts and Rivets**

The volume of new business is no better or worse than it has been for the past several weeks. Specifications from car builders have fallen off a bit as some manufacturers have been catching up with their car programs. Business from fabricators continues steady and no apparent change has been noticed in automobile specifications.

### **Bars**

Demand for hot rolled bars has settled down to a slow leveling off process, but despite the recession of new business, producers are unable to make much better delivery than four to six weeks. There is evidence, however, that the hectic conditions existing in the production end of the business are slowly being cleared up. Farm implement manufacturers are specifying in a limited way and moderate tonnages are moving forward to automobile makers. Indications point to further easing in the rate of new business owing to seasonal tendencies.

### **Steel Sheet Piling**

Awards have been practically non-existent in the past week and activity was comprised for the most part of miscellaneous amounts involving less than 100 tons. Bids will be taken on May 21 for 345 tons of piling for a Naval Supply Depot at Norfolk, Va.

### **Cold-Finished Bars**

The volume of new business in the past week is slightly less than in the preceding period, and backlogs are still four to six weeks, although some sizes are not obtainable in that time. Jobbers are specifying certain sizes, and a fair volume of business is coming from textile machinery manufacturers. Road machinery specifications are fair and electrical appliance manufacturers are entering fill-in orders to work out their production programs. Seasonal influences are having their effect on incoming business, which continues to show signs of a slow recession.

### **Reinforcing Bars**

Reinforcing bar awards in the past week were considerably lighter than the previous period. Deliveries are a little easier and prices remain firm. Inquiry is out for a courthouse at Philadelphia requiring 700 tons.

### **Plates and Shapes**

Bookings for structural material are larger this week than in the previous period. Plate backlogs remain fairly heavy and delivery promises are nowhere near the de-

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;  
Advances Over Past Week in Heavy Type, Declines in Italics

## Rails and Semi-finished Steel

Per Gross Ton:	May 18, 1937	May 11, 1937	Apr. 20, 1937	May 19, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37 1/2
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh.	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	28.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh..	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
Skelp, grvd. steel, P'gh, lb...	2.10	2.10	2.10	1.80

## Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.85
Bars, Chicago.....	2.50	2.50	2.50	1.90
Bars, Cleveland.....	2.50	2.50	2.50	1.90
Bars, New York.....	2.78	2.78	2.78	2.20
Plates, Pittsburgh.....	2.25	2.25	2.25	1.80
Plates, Chicago.....	2.30	2.30	2.30	1.85
Plates, New York.....	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago..	2.30	2.30	2.30	1.85
Structural shapes, New York	2.5025	2.5025	2.5025	2.06 1/4
Cold-finished bars, Pittsburgh	2.90	2.90	2.90	2.10
Hot-rolled strips, Pittsburgh.	2.40	2.40	2.40	1.85
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh..	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary..	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.65
Tin plate, 100-lb. box, P'gh.	\$5.35	\$5.35	\$5.35	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

## Pig Iron

Per Gross Ton:	May 18, 1937	May 11, 1937	Apr. 20, 1937	May 19, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'tl.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd, car- lots.....	102.50	102.50	95.00	75.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 70 per cent or higher.

\* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

## Scrap

Per Gross Ton:				
Heavy melting steel, P'gh....	\$18.75	\$19.75	\$22.25	\$14.25
Heavy melting steel, Phila...	18.25	19.25	19.75	12.75
Heavy melting steel, Ch'go...	16.75	17.25	20.25	12.75
Carwheels, Chicago.....	19.25	19.75	21.75	13.50
Carwheels, Philadelphia....	21.25	21.25	21.25	13.75
No. 1 cast, Pittsburgh.....	19.25	19.75	20.25	15.25
No. 1 cast, Philadelphia.....	20.75	21.25	22.25	14.00
No. 1 cast, Ch'go (net ton).	15.25	15.25	16.75	12.00
No. 1 RR. wrot., Phila.....	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net)	15.25	15.25	18.00	11.50

## Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.60	\$4.60	\$4.60	\$3.65
Foundry coke, prompt.....	5.25	5.25	5.00	4.25

## Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn....	14.00	14.00	14.50	9.50
Lake copper, New York.....	14.12 1/2	14.12 1/2	14.62 1/2	9.62 1/2
Tin (Straits), New York.....	55.25	54.75	56.37 1/2	45.90
Zinc, East St. Louis.....	6.75	6.75	7.00	4.90
Zinc, New York.....	7.10	7.10	7.35	5.27 1/2
Lead, St. Louis.....	5.85	5.85	5.85	4.45
Lead, New York.....	6.00	6.00	6.00	4.60
Antimony (Asiatic), N. Y....	14.50	14.50	17.00	13.50

# The Iron Age Composite Prices

## Finished Steel

May 18, 1937	2.605c. a Lb.
One week ago	2.605c.
One month ago	2.605c.
One year ago	2.097c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1937.....	2.605c., Mar. 9;	2.330c., Mar. 2
1936.....	2.330c., Dec. 28;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.008c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

## Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
\$23.25, Mar. 9;	\$20.25, Feb. 16	
19.73, Nov. 24;	18.73, Aug. 11	
18.84, Nov. 5;	17.83, May 14	
17.90, May 1;	16.90, Jan. 27	
16.90, Dec. 5;	13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

## Steel Scrap

\$17.92 a Gross Ton
18.75
20.75
13.25

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$21.92, Mar. 30;	\$17.92, Jan. 4	
17.75, Dec. 21;	12.67, June 9	
13.42, Dec. 10;	10.33, April 23	
13.00, Mar. 13;	9.50, Sept. 25	
12.25, Aug. 8;	6.75, Jan. 3	
8.50, Jan. 12;	6.43, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.53, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	13.08, Nov. 22	

sires of customers. Inquiries are more plentiful this week and included a good many privately financed buildings and plant additions. American Bridge Co. is furnishing 1450 tons of material for Central Steel & Wire Co. factory building at Chicago.

### ***Sheets***

Backlogs of some sizes and grades are easier this week, especially in the lighter gage cold rolled material, on which promises of six to seven weeks are being given. Incoming business in the past week is considerably less than in the previous period and is due, in some measure, to a falling off in automobile buying. Miscellaneous demand has receded some, but pressure for commitments already made continues unabated. Producers would welcome a further easing of bookings in order to clear up to some extent the delivery situation.

### ***Tubular Products***

Factory and home building is still being reflected in a heavy movement of standard pipe from jobbers' warehouses. Meanwhile, producers have had little time to replenish stocks, as specifications for oil-country goods and line pipe have been exceptionally good. No change in the situation has occurred in the past week and, with the majority of drilling programs being larger than a year ago, a steady flow of orders is anticipated. Mills still have a considerable backlog of orders and are having difficulty in some cases in keeping up with their promises.

### ***Strip***

Hot rolled strip backlogs are easier, now averaging about three to four weeks, with cold rolled deliveries being made in five to six weeks. Specifications have fallen off somewhat in the past week and there has been a noticeable let-up in bookings from automobile parts makers. This condition is undoubtedly due to the fact that considerable banks were built up during automobile labor difficulties. Miscellaneous business in some lines is subsiding because of seasonal influences. Further buying for 1937 automobile models is looked for.

### ***Wire Products***

Brief strike shutdowns affected production some last week, but mills have resumed operations. The volume of new business is about on a par with that received a week ago. With farm purchasing power at a new high, producers feel that on the whole buying of merchant wire items throughout the year

will be at a better rate than occurred in 1936. Jobbers' stocks are spotty. Meanwhile, demand for manufacturers' wire continues at a high level.

### ***Tin Plate***

Ultimate tin plate consumption, owing to seasonal influences, is increasing. Beer and oil cans are in better demand and, while it is still too early for crop estimates, the general opinion is that this year's packs will be larger than a year ago. Some can makers are reported to be experimenting with gallon beer cans. Meanwhile, tin plate production remains at capacity with no signs of a let-down.

### ***Coal and Coke***

Movement of beehive foundry coke is strong, owing to depletion of accumulations built up some time ago. Some moderate sized export orders for foundry coke have been executed. On the whole, beehive furnace coke is not quite as tight as it was several weeks ago. Some stocks were built up in the Connellsville region following a hold-up on orders from a large consumer. This accumulation will disappear in about two weeks. Meanwhile, coke plants are gaging production to shipments and are working about four days a week. Prices continue firm with little spot business being transacted.



## ***... Iron and steel industry well supplied with orders.***

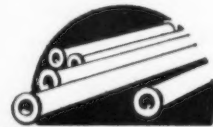
**T**ORONTO, May 18.—The iron and steel industry is well supplied with orders and many companies are in a position to maintain capacity operations throughout the greater part of the year.

A. Cross, president, Dominion Steel & Coal Corp., Sydney, N. S., states that his company has operated at capacity throughout this year to date and has sufficient orders on hand to maintain this rate to the end of the year. He announced that an order for 20,000 tons of steel rails has been received from the South African Government, on which delivery will be made in September.

There has been a good demand for sheets this year, and mills still are some four to six weeks behind in deliveries. New business for spot delivery is appearing in good volume and orders cover practical-

ly all lines of iron and steel materials.

Demand for pig iron is holding at a high level, with prices unchanged. Scarcity of iron scrap has been responsible for sharp increase in foundry and malleable pig iron sales. The melt is holding about 75 per cent of capacity. Some melters are said to be taking iron from the United States, this being the reflection of the sharp jump in prices announced a few weeks ago. Production of iron is sustained with six furnaces blowing.



## ***..CAST IRON PIPE..***

**Boston** has awarded 435 tons of pipe to United States Pipe & Foundry Co. and 150 tons of fittings to a local foundry.

**Westerly, R. I.**, has placed 350 tons of pipe with Warren Foundry & Pipe Corp.

**Hartford, Conn.**, has placed about 260 tons of 6 to 16-in. pipe with United States Pipe & Foundry Co.

**Public Improvement Commission**, City Hall, Baltimore, has authorized construction of 30-in. pipe line under Curtis Creek for water supply. Cost about \$120,000.

**Alexandria Water Co.**, Alexandria, Va., plans new 12-in. line from St. Elmo water reservoir for main water service. Work will be carried out in connection with extensions and improvements at reservoir and main pumping station at Cameron Run, including pumping machinery and other waterworks equipment. Cost about \$50,000.

**New Athens, Ohio**, plans pipe lines for water system and other waterworks installation. Cost close to \$40,000. Paul W. Elwell, 5005 Euclid Avenue, Cleveland, is consulting engineer.

**Fremont, Ohio**, plans pipe line from East State Street to new canning plant of H. J. Heinz Co., Pittsburgh, for water supply. Cost about \$30,000. C. A. Hochenedel, director, Department of Public Service, is in charge.

**Board of Water Commissioners**, East Jefferson Water Works District No. 1, Jefferson Highway, New Orleans, will take bids soon for pipe for water system; also for elevated steel tank and other facilities. Entire project will cost over \$250,000.

**North Baton Rouge Water Works District No. 1**, Baton Rouge, La., plans about 50 miles of pipe lines, various sizes, for water system; also 500,000-gal. elevated steel water tank and tower and other waterworks installation. Special election has been called June 1 to approve bond issue of \$400,000 for project. E. G. Blakewood, Baton Rouge, is consulting engineer.

**Manitowoc, Wis.**, plans main water pipe line in connection with new 3,000,000-gal. reservoir on lake shore at Silver Spring Park. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer.

**Board of Cascade County Commissioners**, Great Falls, Mont., E. H. Carr, clerk, plans pipe lines for water system in new improvement district near Great Falls, recently created, including pumping station. Cost about \$30,000.

**Fillmore, Cal.**, plans about five miles, various sizes, for extensions in water system. Fund of \$45,000 has been authorized for this and other waterworks installation.

**Fresno, Cal.**, has awarded 350 tons to United States Pipe & Foundry Co.

**Santa Ana, Cal.**, has awarded 180 tons for a water system to National Cast Iron Pipe Co.



## CHICAGO

*... Good volume of sales may soon force ingot rate higher.*

o o o

*... Pipe line of 24,000 tons awarded; one of 225,000 tons in prospect.*

o o o

*... Construction outlook improves; no easing in manufacturing consumption.*

CHICAGO, May 18.—Although ingot production remains at 86 per cent of capacity this week, indications are that operations may be increased shortly, as most sellers report a good volume of sales and little reduction in backlogs, with manufacturing consumption showing no signs of easing.

Steady purchasing of wire products, bars and sheets is reported from automobile companies, although specifications are somewhat lighter currently because of an accumulation of stocks. Several companies, however, are expected to come into the market for sheets next week to round out their 1937 model production. Farm implement and tractor plants are operating at capacity, and no let-up in this activity is in sight. Reports from the Northwest indicate good crop prospects now that the excessive rains throughout that region have ceased.

Railroad buying is active, and a great stimulus is being given plates by pipe lines. The A. O. Smith Corp. was awarded a pipe line requiring 24,000 tons of plates, and an inquiry is out for 11,000 tons for a water line in Albuquerque, N. M., while a second Texas-to-Chicago line, if it develops, will take 225,000 tons of plates. The Union Pacific has ordered 3800 cars, and the Burlington plans to build 2500 cars and 14 locomotives. Railroad foundries are said to be booked far ahead, one into October, and another into next year. The American Car & Foundry Co. has found it necessary to open its plant at Madison, Ill., which has been closed throughout the depression.

One of the largest structural projects in recent months has de-

veloped in Baton Rouge, La., where a bridge across the Mississippi will require about 30,000 tons of shapes and 2800 tons of reinforcing bars. The outlook for additional large shape tonnages is bright.

No. 1 heavy melting steel has slumped another 50c. this week to \$16.50 to \$17, but this, it is believed, may register the low mark of the present scrap price decline, as some of the smaller mills on the fringe of this district are said to be buying quietly, and the market appears to be gathering strength.

### Pig Iron

Little new buying is reported, although there has been no reduction in the district melt. Shipments are at the rate of 12 per cent above those in April. No change has yet been noticed in the ratio of pig iron to scrap in melts, but this proportion may be affected if the present low price levels continue in the scrap market. Railroad foundries are operating at capacity, and one is said to be booked into October, and another into 1938. The No. 5 blast furnace of Carnegie-Illinois Steel Corp. went into blast May 15, making a total of nine on at this plant.

### Plates

An award of 24,000 tons of plates to the A. O. Smith Corp. for a short gas line dominated the market the past week. Inquiries for pending construction are both numerous and impressive. In Albuquerque, N. M., a water line is to require about 11,000 tons of plates, and discussion is again current concerning the possible construction of a second pipe line

from Texas to Chicago, which, if carried through, would call for about 225,000 tons. Tank makers continue busy, and a recent order of 1500 tons in miscellaneous lots has been reported. Railroads come into the picture once more as the Union Pacific orders totaling 3800 cars and underframes are disclosed, and the Burlington announces plans for the building in the fall of 2500 cars and 14 locomotives, the steel to be bought late in the summer. The Union Pacific plans to build some of its own cars, and will buy material for the superstructures soon.

### Structural Shapes

General construction activity and awards are light, but several large projects are forthcoming. At Cap au Gris, Mo., a dam across the Mississippi River will require about 5500 tons of shapes, bids having been taken. This dam is the last on the regular Federal building program for the Mississippi, but there is a possibility that two additional structures may be necessary. A bridge across the Mississippi at Baton Rouge, La., will take 30,000 tons, and another bridge at Purcell, Okla., will require 2250 tons. Owens-Illinois Glass Co. is tearing down some buildings at Streator, Ill., which will be replaced by new structures. A viaduct at 103rd Street, Chicago, requiring 1800 tons of shapes was awarded to American Bridge Co., while a bridge over the Red River at Fargo, N. D., taking 850 tons, went to Bethlehem Steel Corp. A great many small jobs are reported, and the aggregate tonnage is said to be impressive.

### Wire Products

Sellers expect the normal summer lull to be manifested this year, although they look for a conservative rise in buying late in the summer. Releases to automobile builders are steady, and farm equipment makers are operating practically at capacity. Crop prospects in the Northwest are exceptionally bright, excessive rains having stopped in time to allow spring planting to proceed about on schedule. Operations are from 85 to 90 per cent of capacity, and present backlogs will enable the continuance of this rate for some time to come. The offering of spring terms around the first of June to rural distributors will stimulate fence purchases.

### Bars

Good sales of bars are reported from mills, and specifications are particularly heavy in cold-drawn and forging steel. Automobile buying is steady, some purchases

already having been made for 1938 models, which are to be started earlier than usual this year. Capacity operations, and therefore, heavy bar consumption, are seen in farm implement and tractor plants, while machine tool builders are also consuming steadily. Deliveries are improving moderately, but no great betterment is expected for the next few months.

### Rails

Little activity is reported this week from rail mills, only a few miscellaneous carlots and about 500 tons for frogs and switches being ordered. Accessories are also quiet, with demand inclined to be spotty. Operations continue steady from back orders, and are expected to be maintained throughout June.

### Sheets

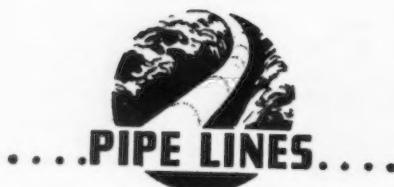
Sheet deliveries are steadily improving, cold rolled and hot rolled being available from one mill in from three to four weeks. New business is light, with stove makers primarily active and demanding prompt shipments. Cold rolled specifications are lighter because of the slackening in automobile purchasing, which makes it possible for one roller, at least, to concentrate more heavily on hot rolled in an attempt to improve deliveries in that grade.

### Reinforcing Bars

Buyers now have more than the price structure to watch. One shop is still closed by a strike and deliveries cannot be made against old commitments. Another shop has been experiencing spasmodic labor troubles and at least one other unit is behind on deliveries. With the exception of a 500-ton auditorium to be built at Burlington, Iowa, all fresh inquiries are small. However, their number is in good volume and there is little change in shop backlogs. After having shown the best stability in months, prices are again subject to wide variation in the immediate Chicago area.

### Warehouse Business

May business has been running 10 per cent above that of the same month last year. Orders are dipping from the April rate, but this is a normal development for this time of year. Country business still leads city demand, but the former is sliding faster than the latter, which indicates the seasonal influence resulting from farmers' engagement in their fields. Warehousemen are closely watching the steel strike situation which, if it expands, will result in a raid on warehouse stocks.



**Mountain Fuel Supply Co.**, 36 South State Street, Salt Lake City, Utah, has authorized new 10-in. welded steel pipe line from gas field at Clay Basin, Wyo., to point near Rock Springs, Wyo., about 20 miles, for natural gas transmission. Connection will be made at latter place with main pipe line of company. Entire project will cost close to \$300,000 with booster and control stations.

**Tacoma, Wash.**, has authorized new 10 and 12-in. steel pipe line in parts of East Thirty-fourth and Pacific Streets for main water supply, replacing existing lines. Cast Iron pipe also will be installed. W. A. Kunigk is water superintendent.

**Humble Pipe Line Co.**, Houston, Tex., has approved immediate construction of new 6-in. welded steel pipe line from Viola, Tex., oil field where company has large pumping station, to Corpus Christi, Tex., about eight miles, for crude oil transmission to refinery of Southwestern Oil & Refining Co. at latter point.

**Bureau of Reclamation**, Denver, asks bids until May 25 for one 39-in. inside diameter welded plate-steel outlet pipe for installation in outlet works at Grassy Lake Dam, Upper Snake River project, Idaho (Specification 926-D).

**Public Service Corp. of Texas**, Llano, Tex., plans welded steel pipe lines for natural gas transmission to Llano and other communities in this area, including Lometa, Lampasses, San Saba and Gold-waithe, where franchises have been secured. Distributing systems will be installed in municipalities noted, including control stations. Entire project will cost over \$300,000.

**Ville Platte (Evangeline County), La.**, plans steel pipe line system for natural gas distribution. Cost about \$75,000. Financing has been arranged through Federal aid.

**United States Engineer Office**, Vicksburg, Miss., asks bids until May 24 for 2500 ft. of 3-in. wrought steel pipe, and for 1710 ft. of wrought steel pipe, other sizes, with 78 elbows, tees, unions and couplings (Circular 246).

**Phillips Petroleum Co.**, Bartlesville, Okla., has authorized new 6-in. welded steel pipe line in part of North Lindsay Avenue, Bartlesville, about 6600 ft., for high-pressure natural gas transmission. A. H. Riney is company engineer.

**Rehoboth Beach Gas Co.**, Rehoboth Beach, del., recently organized by Philip C. Dennis, Berlin, Md., and associates, plans pipe line system for gas distribution, including main line under Lewes-Rehoboth Beach Canal. Work is scheduled to begin early in fall. Company has secured about three acre tract for new artificial gas plant.

**Albuquerque, N. M.**, will buy 11,000 tons for a water main.

**A. O. Smith Corp.**, Milwaukee, has been awarded 24,000 tons for a pipe line.



**... Market, still strong, affected by Coronation and holidays.**

**LONDON**, May 18 (*By Cable*)—The iron and steel markets have been influenced by the Coronation and also by the Whitsuntide holidays, but owing to the strong production activity the vacation was short.

Furnaces are heavily sold and buyers are still clamoring for supplies despite recent price advances. Cleveland iron is still unobtainable and new prices are not yet arranged.

Semi-finished steel supplies are still scarce, though April raw steel output amounted to over a million tons. An import increase from the Continent is expected by the end of May or early in June.

Finished steel makers are heavily sold and are refusing buyers who are offering substantial premiums.

The tin plate market is quiet and prices are firm. Black galvanized sheet rollers are only quoting for far forward delivery.

The Continental steel market is active and large premiums are being offered. Deliveries are delayed for five months. South America and the Far East are the chief buyers.

The Government of Manchukuo will control the import and export sales of iron and steel.

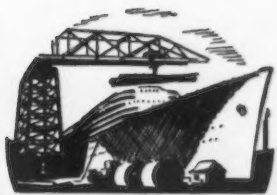
The first blast furnace of the Richard Thomas new Ebb Vale steel works is expected to be blown in July.

Pig iron exports from the United Kingdom during April amounted to 16,000 tons, none of which went to the United States. Total iron and steel exports amounted to 239,500 tons.

British price on beams changed to £10, 12s. 6d. Continental prices are unchanged.

## Pacific Coast Has A New Steel Mill

**T**HE recently organized West Coast Steel Co. has started production at its plant at South San Francisco, Cal. The company rolls bars, light structural steel and light reinforcing steel from scrap steel rails. The officers are C. B. Runkel, president; L. S. Runkel, vice-president, and William Tynan, secretary and treasurer.



## .. PHILADELPHIA ..

... *Mill operations average 71 per cent.*

... *Shipments outrun new orders.*

... *Steel scrap shows \$1 decline.*

PHILADELPHIA, May 18.—Most sellers are more concerned with deliveries on old orders than in the booking of new commitments. There is some disappointment as to decline in consumer interest for certain types of products. In all grades of steel, shipments are generally in excess of new orders, the result being a gradual improvement in the delivery situation for all of the district producers.

Backlogs are still large enough, however, to preclude any large alteration in mill activity. Even though several of the district producers report slight changes in operating rates, the average for the eastern Pennsylvania area remains in the neighborhood of 71 per cent of potential capacity.

Consumers here are showing no great interest in possible price changes for the fourth quarter. They are still able to enter orders for delivery far ahead of that period, and are generally confident that sufficient time will be available to enter protective commitments in the advent of a price rise.

Although mills continue to eat into scrap inventories, none of them is showing any interest in acquiring new supplies. This disinterest, coupled with a lull in export buying, has reflected in price weakness throughout the entire list, which averages around 50c. for specialties and \$1 for heavy steel making grades.

### **Pig Iron**

Most sellers would like to realize a better return on third quarter shipments, but none so far in this area has definitely asked for higher prices. Third quarter books, of course, are not publicly open, but opinion persists that more than one furnace has already considered inquiries for that period. Foundries are still able to get second quarter deliveries on new orders. A good volume of iron is being exported on old orders. No new foreign orders

have been placed during the week, and, for that matter, the volume of firm foreign offers has definitely fallen off over the past fortnight.

### **Sheets and Strip**

Rolling schedules on light flat rolled products continue to be the most congested of all steel products, but even in this case the past several weeks has witnessed a steady improvement in delivery schedules. Even though some mills at first glance seem unable to consider additional commitments until well into the third quarter, a little shopping around enables most buyers to place certain grades for this quarter or very early in the following period. Heavy cold rolled sheets, hot rolled annealed and hot rolled pickled sheets continue in the worst position, but autobody grades and galvanized sheets are being shipped at considerably higher volume than replacement orders are being received. Strip demand has slackened considerably over the past several weeks, the result being that almost prompt delivery is possible on new orders, or, at the most, several weeks for narrow sizes. Although district offices here do not profess to know what fourth quarter price policy will be, the general opinion is that current quotations will rule over the remainder of the year.

### **Shapes and Bars**

Although the market for constructional steels has thrown off some of the lethargy of several weeks ago, fabricators are still far from enthusiastic about selling possibilities over the next several months. Several Philadelphia schools should come up for bidding in June and a few mill buildings are currently being figured, but otherwise the activity in shapes and reinforcing steels is confined to a scattered and moderate volume of State highway construction. Announcement is expected momentarily on the 480 tons of shapes for the Delaware-Chester bridge, and other

tonnages currently in sight include 4500 tons of shapes and at least 1000 tons of bars for the Philadelphia court house, which will be bid on June 8; 1800 tons of shapes and 400 tons of bars on a bridge at Weissport, Pa., on which tenders are due May 28; two bridges in Indiana County, Pa., which call for 360 tons, bids due May 21, and a court house in Erie, Pa., which calls for 270 tons of shapes, bids May 18. A bridge in Wilmington, Del., is open for bids until June 9 and will require 350 tons of bars.

### **Plates**

Incoming business as a whole has fallen somewhat under shipments, the result being a slightly easier situation on new business. Universal plates are now available in about three weeks and sheared plates average about five weeks, although the situation at particular plants may in certain instances be more congested. The 700 cars to be built in the Reading Co. shops is the outstanding job of the district, and the 3000 to 4000 tons of steel and the sizable quantities of specialties required will very probably come into the market during the current week. Most sellers admit the belief that deliveries on sheets will continually improve over the summer months, but all confidently look forward to an increasing demand starting in the early fall period.

### **Imports**

The following iron and steel imports were received here during the past week: 950 tons of manganese ore from Russia; 4 tons of steel billets from Sweden; 4 tons of diamond plates, 25 tons of steel bands, 126 tons of steel bars and 145 tons of structural shapes from Belgium.



## .. BIRMINGHAM ..

... *Two blast furnaces resume production.*

... *Mills still under pressure for shipments.*

BIRMINGHAM, May 18.—The active blast furnace total is back at 16, following a loss of two in April. Woodward No. 3 of the Woodward Iron Co., which was shut down in April, has resumed production. As previously reported, the Gadsden furnace of the Gulfsteel division of the Republic Steel Corp.

was blown in on May 9. Sloss-Sheffield's No. 1 furnace, blown out in April for repairs, is expected to start again around June 1. The active total is made up as follows: Tennessee Coal, Iron & Railroad Co., seven; Woodward Iron Co., three; Sloss-Sheffield Steel & Iron Co., three; Republic Steel Corp., three.

Steel production is steady and unchanged, with 18 open hearths in operation. Eight are on at Fairfield, five at Ensley and five at Gadsden.

Steel backlogs are still heavy and the mills are still under pressure to meet production and shipping demands. Bookings have receded somewhat, but this was to be expected as the mills, for a time, sold beyond their ability to produce.

Demand for wire products and roofing sheets from the farm markets has lately been light, as this is the off season, with planting in full swing. However, bars, plates and shapes are active.

It now looks as if the Ensley rail mill will run steadily until late July or early August. Previously there had been some talk of a shutdown in June.

Republic Steel Corp. is planning a new plant office building at its newly acquired Gadsden works, and all departments connected with operations of the Gulfsteel division will be moved there. Several departments have already been moved. Around June 1, L. E. Geoghegan, division manager, will have his headquarters there, moving from Birmingham.



## ....BUFFALO....

*... Building projects are taking more steel.*

**B**UFFALO, May 18.—New reinforcing bar business has been placed and more is in prospect, with considerable new construction work throughout the district. The City of Buffalo placed an order for 250 tons for intercepting sewers in another segment of the new sewage disposal plant job. The Eastern States Milling Co., which will build a plant addition, placed 460 tons with a district distributor.

The New York Telephone Co. will construct two new buildings in Buffalo to require 150 tons of bars, and a sewage disposal plant at Olean, N. Y., will require 102 tons. An unestimated, but considerable

tonnage of bars will be required for the new cell block of the Attica State Prison, which will use also about 500 tons of structural shapes.

Pig iron business is holding steady with satisfactory specifications by melters against previously purchased tonnages. Considerable new buying is expected by the end of the month.

Steel mill operations continue unchanged, with Bethlehem's Lackawanna plant operating 28 to 29 open hearths; Republic, eight, and Wickwire Spencer Steel Co., two.



## ....CINCINNATI....

*... Orders for sheets equal to 90 per cent of capacity.*

o o o

*... Deliveries on some grades easier.*

**C**INCINNATI, May 18.—While new business in sheets eased a trifle the past week, there is nothing in the market trend to warrant pessimism. Current ordering is all for third quarter, with occasional business for the fourth quarter at whatever prices are then prevailing. Current demand is estimated at about 90 per cent of capacity. Automotive ordering is beginning to taper. Delivery on most sheets is easing as mill capacities gradually catch up with backlogs. Annealed sheets, however, are still short of consumer demand, but producers are taxing their production departments to bring shipments near to requests.

Although the melt is steadily heavy, ordering of pig iron is listless. Only a few carload and 100-ton orders were reported the past week. Melters generally have fair inventories and appear confident that material will be available as needed. In addition, the steadiness of prices has offered no incentive to forward buying.

Warehouse business is holding to recent peak levels as delayed mill deliveries help jobbers. Prices are firm.

Steel ingot production hovers around 90 per cent. One interest reduced active open hearths to seven this week to keep one stack in reserve for emergencies. Thirty out of 34 furnaces are now producing.



## ....ST. LOUIS....

*... Steel demand shows signs of decline.*

o o o

*... Strike threats add to strength of market.*

**S**T. LOUIS, May 18.—A falling off in steel business is reported. However, this is to be expected because of heavy commitments previously made. Prices are holding firm, strikes and threats of strikes in the industry adding to the strength in the market. Deliveries on sheets are improving somewhat, but plates are still considerably delayed. Wire products stocks in hands of warehouses and dealers, which have been extremely heavy, are still being liquidated.

In view of the large tonnages of pig iron bought in anticipation of higher prices, the volume of buying now is better than makers had expected. It was thought that melters had purchased a sufficient quantity for use through the second quarter and even into the next period, but some have found that business was better than had been anticipated, and are buying more to meet their requirements. Foundries catering to the electrical trade here have been affected by strikes in the latter industry, but these are being settled. The melt in other lines is being well maintained.

Ingot operations continue at the peak of 90 per cent of capacity.



## RAILROAD BUYING

Union Pacific has placed orders for 3800 freight cars of which 1000 50-ton ballast cars will be built by American Car & Foundry Co., 200 tank cars are to be built by General American Transportation Corp., and 1900 box cars and 700 auto box cars will be built in Union Pacific shops. Ryan Car Co. was awarded the order for welded, lightweight underframes for the 1900 box cars and 700 auto cars.

New York Rapid Transit Co. is considering the purchase of a seven car articulated train for use on Brooklyn-Manhattan subway.

Santa Fe has ordered 22 buses from American Car & Foundry Motors Corp.



## ... CLEVELAND ...

... *Strike threats cause some advancing of shipping dates on sheets.*

... *Volume of new business holds at around 75 per cent of shipments.*

... *Finishing mills are not being crowded as hard, but ingot output holds up.*

CLEVELAND, May 18.—New business in finished steel has leveled off and shows little change in volume as compared with the early part of the month. However, there has been a temporary increase in releases of sheet specifications from some consumers who advanced their shipping dates because of danger of delayed deliveries should threats of strikes in some of the mills materialize. The volume of new business is around 75 per cent of shipments.

Deliveries continue to improve on most lines, although products that mills can sell for delivery in late June are mostly bars, cold rolled sheets and structural shapes.

Ingot output is being maintained at close to recent levels. Production declined one point in both the Cleveland-Lorain and Youngstown districts this week, being 87 per cent in the former and 86 per cent in the latter.

With reduced pressure for deliveries, operations of finishing mills are not being crowded to the extent that they were a few weeks ago. Most consuming industries are maintaining high rates of operations, but either have good stocks or are receiving shipments against old orders. However, operations of quite a few plants in this territory are being interrupted by strikes.

Business from railroads is limited to miscellaneous orders. Because of the shortage of steel, some of the rail mills have fallen behind on their rail delivery schedule.

Bolt prices have been reaffirmed for the third quarter, but nuts have been advanced 5 to 10 per cent. Prices on large rivets also

have been reaffirmed. Small rivets have been advanced.

### Pig Iron

Shipments continue heavy, being about 15 per cent greater so far this month than during the corresponding period in April, and this in spite of hold-ups by a number of foundries that are closed by labor troubles. As consumers are well covered, new demand is limited to small lots. Consumers are showing no interest in third quarter prices, which probably will not be named until about June 1. No advance is looked for.

### Sheets

Fear of delayed deliveries because of threatened strikes in steel plants has brought out releases for considerable sheet tonnage that otherwise would not be taken by consumers until later. New demand is holding up to about the same volume as the past two or three weeks and deliveries continue slowly to improve. However, there seems to be no appreciable reduction in backlogs of light hot rolled and galvanized sheets and some of the mills are filled up with these grades into August. Cold rolled sheets are available for late June shipment. Some orders have been placed for new models of automobiles, but releases are not expected against these before June. Sizable sheet orders have been placed by some of the refrigerator manufacturers for third and fourth quarter delivery, sales for the later delivery period being subject to prices prevailing at time of shipment.

### Strip Steel

Specifications continue good both for hot and cold strip, but new

business is light and deliveries are growing better. Some mills are now able to make fairly prompt shipments of hot rolled sheets, but others cannot take new orders for delivery before June 20. Mills generally have all the cold strip orders they can fill in June. Pressure for deliveries continues from the agricultural implement manufacturers.

### Bolts, Nuts and Rivets

Bolt and nut manufacturers have reaffirmed bolt prices for the third quarter and some have reduced their discounts five points on hot pressed and cold punched nuts and 10 points on semi-finished hexagon nuts, thus advancing net prices from 5 to 10 per cent. Others are expected to make similar advances on nuts. While no action has been taken as yet on stove bolts, prices on these probably will be reaffirmed. Rivet manufacturers have reestablished the present prices on large rivets of \$3.60 per 100 lb., Pittsburgh and Cleveland, and \$3.70, Chicago and Birmingham, and have advanced small rivets about 10 per cent by changing the discount from 70 per cent off list to 65 and 5 per cent off list. The price of small rivets was not changed when the last advance was made on large rivets. Bolt and nut business has fallen off, and, as manufacturers have completed shipments of old low price orders, their backlogs have been sharply reduced and they are in need of a greater volume of business to enable them to maintain present operations.

### Bars, Plates and Shapes

Demand for hot rolled bars is moderate, new business being about the same volume as during the previous two or three weeks. With shipments heavier than incoming business, backlogs are disappearing and deliveries can be secured in two to four weeks. Forge shops and most other consumers are using bars at a good rate, but many still have considerable steel in stock. Plate business is lighter, but little improvement is reported in deliveries. Structural shapes are in fair demand, with deliveries promised in six weeks by some mills. Inquiry for fabricated work is light. Plans were to be out this week for a new plant for the Industrial Rayon Corp., Cleveland, which will take more than 3000 tons of structural shapes, but this project may be temporarily delayed by a strike in the company's present plant. Bids were to be taken in Columbus today for the Lorain Avenue grade crossing elimination in Cleveland, requiring 500 tons of shapes and 500 tons of reinforcing bars. Bids were rejected for the Toledo vocational

high school, requiring 1700 tons, because they exceeded the estimate and the job will be readvertised. Cleveland has taken bids for sewage plant work requiring 300 tons of reinforcing bars.

### Iron Ore

Consumption of Lake Superior ore during April amounted to 5,114,177 tons, a decrease of 28,319 tons as compared with March. Furnace stocks May 1 amounted to 12,295,385 tons and stocks at furnaces and on Lake Erie docks on that date were 14,632,038 tons. This is a decrease of 4,737,652 tons from May 1, last year. There were 155 furnaces using Lake ore in blast April 30, an increase of five for the month.

## Crucible Employees Ask for NLRB Vote

WASHINGTON, May 18.—Independent employee union members of the Pittsburgh Crucible Steel Co. not associated with either outside unions or the company have petitioned the National Labor Relations Board at Washington and the regional office in Pittsburgh for a Government-supervised election to determine the collective bargaining agency for Pittsburgh Crucible's employees.

## Crucible Conference Postponed to May 24

PITTSBURGH, May 18.—Conferences between F. B. Hufnagel, chairman Crucible Steel Co. of America, and SWOC leaders, relative to a union contract will be continued May 24, it was announced today, following a three-hour meeting. Although SWOC officials had previously indicated that they would ask for sole collective bargaining rights in future negotiations, the question being discussed with the Crucible Company covers a contract for union members only, similar to written agreements signed in the past several months by other steel companies.

## SWOC Claims Headway in Detroit

DETROIT, May 18.—Nine sheet metal companies in the Detroit district will make contracts with the Steel Workers Organizing Committee, according to Charles Kiser, union director for the district. Kiser said also that four Detroit plants affiliated with the metal industry have signed, two granting sole bargaining rights and one providing for the check-off. The Great

Lakes Steel Corp. is not included in this group, but the SWOC is to ask for a contract from the parent company, National Steel Corp.

After a strike at the plant of the National Smelting & Refining Co. at Ecorse, Mich., the company signed a contract, Kiser said, boosting wages from a minimum of 20c. an hr. to 40c. The SWOC has signed contracts with the Rotary Electric Steel Co., the Modell-Friedman Steel Corp. and the Federated Metals Corp.

## Scrap Dealers Make Labor Agreement

THE first labor agreement to be negotiated in the history of the scrap iron industry was completed May 15 between the New York chapter of the Institute of Scrap Iron and Steel and the Waste Material Sorters, Trimmers and Handlers Union, affiliated with the American Federation of Labor, it was announced by Benjamin Schwartz, director general of the institute. The agreement recognizes the union as the sole collective bargaining agency for the scrap iron industry in the City of New York, Westchester County and Long Island.

The parties agree to negotiate a written labor agreement within the next 45 days, which is to be restricted only to wages and hours; the closed shop is eliminated in advance from the negotiations. Upon completion of the negotiations, a written agreement is to be signed for a period of two years, with the understanding that the union shall have the right at the expiration of the first year to negotiate for a revision of wages and hours.

The agreement is contingent upon the union securing jurisdiction over all classes of workers employed in the scrap iron industry; this is requested by the employers in order to avoid conflicting demands and jurisdictions over various classes of workers, already presented by various unions affiliated with A. F. of L. or other groups.

During the term of the agreement, there shall be no strikes, sit-downs, lock-outs or any other interruptions in the operations of the industry, all disputes with reference to wages and hours to be submitted to the National Labor Relations Board or some other agency to be mutually agreed upon.

The New York chapter of the Institute comprises approximately 100 scrap iron dealers, representing over 90 per cent of the tonnage handled in the metropolitan district.



## REINFORCING STEEL

... Awards of 1410 tons  
—11,275 tons in new projects.

### AWARDS

Buffalo, 250 tons, intercepting sewers, Buffalo sewage disposal plant, to Igoe Brothers.

Buffalo, 460 tons, addition to Eastern States Milling Co., town of Tonawanda, to Truscon Steel Co.

Little Falls, N. Y., 300 tons, Chris Hanson laboratory building, to Truscon Steel Co.

Pittsburgh, 200 tons, Pittsburgh "Post-Gazette" building; bars to be furnished to W. F. Trimble, contractor, by W. N. Dam-bach, Inc., and Metzger-Richardson Co.

Chicago, 200 tons, Sanitary District work, to an unnamed bidder.

### NEW REINFORCING BAR PROJECTS

Buffalo, 150 tons, New York Telephone Co. building.

Olean, N. Y., 102 tons, sewage disposal plant.

Attica, N. Y., unstated tonnage, cell block for Attica State prison.

Philadelphia, 1000 tons, Federal court house; bids June 8.

Weissport, Pa., 400 tons, bridge; bids May 28.

Norristown, Pa., 300 tons, building for Adam Scheidt Brewing Co.

Wilmington, Del., 350 tons, bridge; bids June 9.

Anderson, Ind., 250 tons, Delco-Remy plant addition.

Fort Wayne, Ind., 120 tons, International Harvester Co. building.

Cleveland, 300 tons, sewage disposal plant.

Davenport, Iowa, 260 tons, sewage disposal plant; O'Neil Co., St. Paul, low bidder on general contract.

Burlington, Iowa, 550 tons, auditorium and armory.

Baton Rouge, La., 2800 tons, bridge across Mississippi River.

San Francisco, 2500 tons, railway terminal for San Francisco-Oakland Bay bridge; bids June 16.

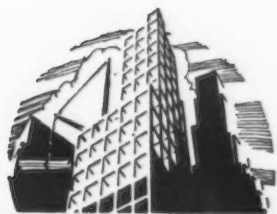
San Francisco, 1800 tons, Sunset reservoir; bids June 9.

Fort Baker, Cal., 110 tons, wharf; bids May 28.

Cheyenne, Wyo., 115 tons, State highway bridges; bids opened.

Panama Canal Zone, 425 tons; bids May 20.

The Bureau of Supplies and Accounts, Navy Department, will open bids on June 4 for approximately 170 tons of sheet piling for the Navy Yard at Cavite, P. I.



## ... NEW YORK ...

... *Deliveries easier as orders fall below volume of shipments.*

o o o

... *Backlogs still heavy; all second quarter tonnage will not be shipped by July 1.*

o o o

... *It now appears that July production will not fall much below that of June.*

NEW YORK, May 18.—No marked change is discernible in steel trade. Although some mills are quoting somewhat quicker shipments than have hitherto been obtainable, this situation does not apply to all mills or to all products. Plates afford a good illustration of the present condition. Some of the larger plate mills are sold up for periods ranging from two to four months, but a few of the smaller mills can take business for shipment within a few weeks, or even less under pressure from buyers. Even those companies that still have large backlogs in certain products are occasionally able to work in some tonnage because of open spaces in rolling schedules.

While the delivery situation is getting somewhat easier, backlogs are being reduced only to a moderate extent, as incoming tonnage is in fairly good volume, though much below that to which the mills have become accustomed in recent months. With the beginning of the third quarter only six weeks away, it now appears that some companies will not be able to ship by July 1 all of the second quarter tonnage they have on their books. Thus, a considerable volume of business, originally scheduled for this quarter's production, will go over to the next quarter. On this basis, it may be assumed that July production will not fall much, if any, below that of June.

Steel salesmen find that some steel buyers, particularly among the smaller companies, have had a peculiar psychological reaction to

the easier steel situation. For many weeks they had infrequent visits from steel salesmen, who are now going the rounds in search of orders; they are also offered much quicker shipments than were obtainable some weeks ago. They have apparently deduced from this

that a marked falling off in steel business is in prospect, which has caused them to adopt a conservative attitude toward fresh purchases. The large steel users, with an abundance of orders on their books, are less inclined to view the immediate future with anything but confidence. Stocks of steel in the hands of manufacturing consumers are not, as a rule, burdensome, but jobbers' stocks are fairly heavy, and there has been an effort among them to lighten their investments.

### Pig Iron

An English order of close to 100,000 tons featured the export market in the last 10 days. Continental demand continues good, and inquiries up to 25,000 tons have been reported, some for delivery as late as October. Dull best describes the local domestic market, although deliveries on old contracts are still at peak levels. Except for minor spot orders, no further buying is anticipated until third quarter prices are announced around June 1. Sentiment regarding new prices is about equally divided among local brokers, but most believe that an ultimate rise in price is inevitable unless the bottom should drop out of the export market. Shortages of ore, coke and pig iron abroad point to continued demand there, however.

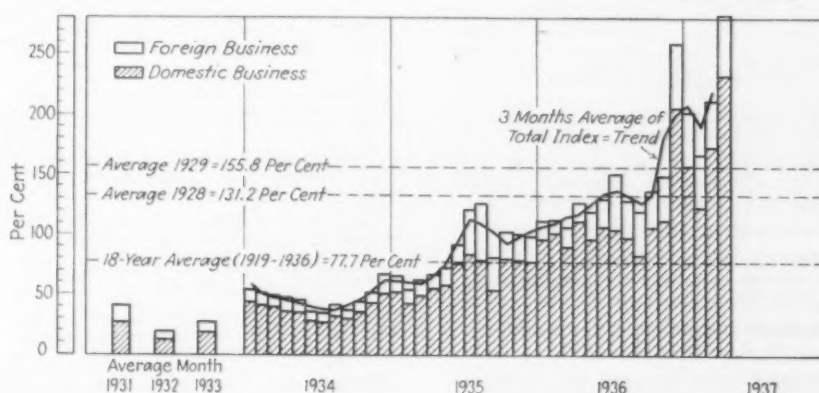
## Machine Tool Orders in April Rise Above the December Peak

MACHINE tool orders in April equaled 282.5 in the index of the National Machine Tool Builders' Association, thereby exceeding the previous peak month, December, 1936, by about 10 per cent. The December index figure was 257.7.

The gain was largely accounted for by domestic business, which was

a third larger than in March. Foreign orders were higher than in March, but slightly below those of December.

The National Machine Tool Builders' Association index is based on the volume of shipments in 1926. In every month in 1936 and 1937 the index figure on orders has been higher than the 1926 average.





# FABRICATED STEEL

*... Lettings slightly higher at 16,700 tons, compared with 15,970 tons last week.*

□ ○ □

*... New projects advance to 27,425 tons from 21,000 tons a week ago.*

○ ○ ○

*... Plate awards only 320 tons.*

## NORTH ATLANTIC STATES

Gill-Montague, Mass., 3500 tons, State bridge, to Phoenix Bridge Co., Phoenixville, Pa.

Lawrence, Mass., 120 tons, water purification plant, to West End Iron Works.

New York, 175 tons, warehouse alterations, West 35th Street and 11th Avenue, to Post & McCord, Inc.

New York, 780 tons, Westchester Avenue bridge in Bronx, to American Bridge Co.

New York, 400 tons, store and apartment building, Springler-Van Buren Estates, to Drier Structural Steel Co.

New York, 370 tons, ventilation building, Port of New York Authority, to Bethlehem Steel Corp.

New York, 450 tons, building, Spear & Co., to Harris Structural Steel Co.

Scarsdale, N. Y., 550 tons, senior high school, to Belmont Iron Works, Philadelphia.

Ithaca, N. Y., 290 tons, grade crossing elimination, to Harris Structural Steel Co., Plainfield, N. J.

Morristown, N. J., 140 tons, theater, to Park City Iron Works.

Bound Brook, N. J., 270 tons, Calco Chemical Co., to Savary & Glasser Co.

Essex County, N. J., 115 tons, Essex outdoor substation, to B. Katchem Iron Works.

Cameron County, Pa., 425 tons, bridge, to Lackawanna Steel Construction Corp., Buffalo.

Clearfield County, Pa., 485 tons, bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Tunnelton, Pa., 440 tons, bridge, to American Bridge Co.

Livermore, Pa., 425 tons, bridge, to American Bridge Co.

Washington, 130 tons, National W. I. & A. B. Co. building extension, to Fort Pitt Bridge Works Co., Pittsburgh.

## SOUTH AND SOUTHWEST

Grafton, W. Va., 120 tons, Carr China Co. factory extension, to Pittsburgh Bridge & Iron Works, Rochester, Pa.

Lowndes County, Miss., 145 tons, bridge, to Jones & Laughlin Steel Corp.

Perry County, Miss., 285 tons, bridge, to Nashville Bridge Co., Nashville, Tenn.

Lawrence County, Miss., 325 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

Crittenden County, Ark., 390 tons, bridge, to Arkansas Foundry Co., Little Rock, Ark.

Garvin County, Okla., 290 tons, bridge, to Pittsburgh-Des Moines Steel Co.

State of New Mexico, 115 tons, gates for Bureau of Reclamation, to California Steel Products Co., San Francisco.

## CENTRAL STATES

Detroit, 480 tons, machine shop additions, Chrysler Corp., to Whitehead & Kales.

Detroit, 175 tons, Midland Steel Products press building, to Whitehead & Kales Co., Detroit.

Rossford, Ohio, 160 tons, boiler house extension, Libbey-Owens-Ford Glass Co., to R. C. Mahon Co., Detroit.

Cincinnati, 1035 tons, Cincinnati Chemical Works buildings, to American Bridge Co.

Cleveland, 110 tons, crane runway for White Motor Co., to Patterson-Leitch Co.

Ottawa, Ill., 570 tons, transfer building extension for Libbey-Owens-Ford Glass Co., to Mississippi Valley Structural Steel Co., St. Louis.

Chicago, 170 tons, shop building, to Duffin Iron Co., Chicago.

Rochester, Minn., 150 tons, grandstand, to Paper Calmenson Co.

Fargo, N. D., 850 tons, bridge, to Bethlehem Steel Corp.

## WESTERN STATES

State of Wyoming, 300 tons, gates for Bureau of Reclamation, to American Bridge Co.

Cheyenne, Wyo., 850 tons, sheds for Union Pacific Railroad, to Omaha Steel Works, Omaha, Neb.

Los Angeles, 450 tons, studio for Metro-Goldwyn-Mayer, to Consolidated Steel Corp.

Santa Monica, Cal., 200 tons, Douglas Aircraft plant, to Bethlehem Steel Corp.

Downey, Cal., 200 tons, plant for Aviation Mfg. Co., to Soule Steel Co.

Sawtell, Cal., 100 tons, Veterans' administration annex, to Minneapolis-Moline Power Implement Co., Minneapolis.

Burbank, Cal., 150 tons, Lockheed plant, to Bethlehem Steel Corp.

## NEW STRUCTURAL STEEL PROJECTS

### NORTH ATLANTIC STATES

Peabody, Mass., 300 tons, Lawrence Leather Co. plant.

New York, 750 tons, public school No. 115.

Brooklyn, 550 tons, addition to public school No. 131.

Creedmore, N. Y., 400 tons, reception building, State hospital.

Rochester, N. Y., 240 tons, building, American Nepheline Corp.

Rochester, N. Y., 2000 tons, General Motors accessory plant.

Attica, N. Y., 500 tons, new cell block for Attica State prison.

Buffalo, 500 tons, Erie County jail; John W. Cowper Co., contractor.

Weissport, Pa., 1800 tons, State bridge; bids May 28.

Westmoreland, Pa., 360 tons, two bridges; tenders May 21.

Philadelphia, 4500 tons, Federal court house; bids June 8.

Newark, N. J., 230 tons, building, Schnefel Brothers.

Burnham, Pa., 350 tons, extension to forge shop, Standard Steel Works Co.

Blairsville, Pa., 400 tons, State highway bridge.

Reading, Pa., 400 tons, building alterations, Parish Pressed Steel Co.

### SOUTH AND SOUTHWEST

Madisonville, Ky., 600 tons, coal tipples.

State of Tennessee, 400 tons, operating bridge for Pickwick Landing dam, Tennessee Valley Authority.

New Orleans, 360 tons, cutting edges, Louisiana River State bridge.

Corinth, Miss., 700 tons, bridge.

Purcell, Okla., 2600 tons, South Canadian River State bridge.

### CENTRAL STATES

Detroit, 500 tons, manufacturing building, Argonaut Realty Corp., General Motors Corp.

Detroit, 500 tons, two housing projects.

Detroit, 370 tons, Plymouth plant expansion.

Anderson, Ind., 200 tons, Guide Lamp Division, General Motors Corp.

Anderson, Ind., 900 tons, Delco-Remy plant.

Painesville, Ohio, 3000 tons, plant for Industrial Rayon Corp.; bids soon.

Chicago, 200 tons, bleachers for Wrigley Field.

Milwaukee, 450 tons, service building, water purification plant; bids May 24.

Green Bay, Wis., 125 tons, granite shop, Wisconsin State Reformatory; Milwaukee Bridge Co., low bidder.

### WESTERN STATES

Manderson, Wyo., 400 tons, State bridge.

Satsop, Wash., 300 tons, State bridge.

State of Washington, 200 tons, bulkhead gate, etc., Specification 758, Bureau of Reclamation, Grand Coulee Dam.

San Francisco, 2840 tons, railway terminal for San Francisco-Oakland Bay bridge; bids June 16.

## FABRICATED PLATES

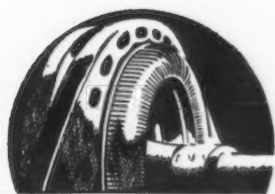
### AWARDS

Cincinnati, 190 tons, standpipe for Treasury Department, to Chicago Bridge & Iron Works.

Council Bluffs, Iowa, 130 tons, softener tank, to Graver Tank & Mfg. Co.

## SHEET PILING NEW PROJECTS

Norfolk, Va., 345 tons, Naval Supply Depot.



## ...NON-FERROUS...

... **Copper buying is still cautious while price holds steady.**

o o o

... **Tin buying hesitant despite attractive price.**

**N**EW YORK, May 18.—Even though general sentiment has been that copper production was outstripping consumption, the latest statistical data show an unexpectedly favorable position. World refined stocks of the red metal dropped to 283,363 tons in April as apparent world consumption rose 6000 tons to 216,877 tons,

while refined output showed only a slight advance to 191,809 tons. The domestic market, however, does not show much activity. Though the price remains steady at 14c. per lb., consumers are unwilling to enter orders as they are yet not fully convinced that the market has become stabilized. There is little, if any, nearby metal available, and

the only position open for sizable tonnages are August and beyond. Sales through the middle of the month totaled 18,887 tons, which low figure is indicative of consumers' caution in the current unsettled period. Abroad, the market continues to be somewhat listless, with the list figure for copper at 14.57c.

### Lead

The current price of 6c. per lb., New York, is quite firm, and is attractive enough to consumers to encourage a good volume of well-diversified orderly buying. At the present time, the May position is considered almost entirely covered, but about 50 per cent of the June requirements is yet to be booked.

### Brass and Bronze

The Non-Ferrous Ingot Metal Institute has announced that on May 1 the unfilled orders for brass and bronze ingots and billets on members' books was 20,540 tons.

### Zinc

Although stocks on hand are extremely low, this situation is considered as being on the mend. The result is that sellers are fairly well satisfied with the current market price of 6.75c. a lb., East St. Louis, and 7.10c., New York, and are willing to consider new commitments at these figures for shipment in July and beyond. However, buyers are still quite cautious and generally not anxious to come into the market unless they actually need the metal. There is a little prompt spelter being disposed of currently, but activity is confined mostly to the taking of orders on average-price futures contracts. Prime Western sales last week aggregated 1756 tons, and undelivered contracts during the same period dropped 4135 tons to 68,556 tons.

### Tin

This market continues to be totally listless, what with the English exchange suffering from a post-holiday inertia and American buyers discouraged by softness in the stock market and strike threats among steel-making independents. In sympathy with a slightly firmer tendency pricewise in London, the New York quotation for Straits pig has improved fractionally to 55.25c. per lb. Other than a little speculative trading, offerings of metal at this figure have failed to attract the slightest interest. No consumer can be considered well stocked, and sellers are looking forward to a shift in buying sentiment during the next fortnight. In London, on first call today, prompt metal was listed at £249 10s. and three-months metal at £245 5s. The quotation at Singapore was in the neighborhood of £248 10s.

### The Week's Prices. Cents Per Pound for Early Delivery

	May 12	May 13	May 14	May 15	May 17	May 18
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.	14.12 1/2	14.12 1/2	14.12 1/2	14.12 1/2	14.12 1/2	14.12 1/2
Straits tin, spot, New York	54.75	54.625	54.75	55.00	55.00	55.25
Zinc, East St. Louis.	6.75	6.75	6.75	6.75	6.75	6.75
Zinc, New York	7.10	7.10	7.10	7.10	7.10	7.10
Lead, St. Louis	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00

\*Delivered Connecticut Valley; price 1/4c. lower delivered in New York.

†Noon Price.

Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.

Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.

Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.

Antimony, Asiatic, 14.50c. a lb., prompt, f.o.b., New York.

Quicksilver, \$96.00 to \$98.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 14.50c. a lb. delivered; in Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

#### From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	56.00c. to 57.00c.
Tin, bar	59.25c. to 60.25c.
Copper, Lake	15.00c. to 16.00c.
Copper, electrolytic	15.00c. to 16.00c.
Copper, castings	14.75c. to 15.75c.
*Copper sheets, hot-rolled	21.62 1/2c.
*High brass sheets	19.50c.
*Seamless brass tubes	22.25c.
*Seamless copper tubes	22.37 1/2c.
*Brass rods	16.00c.
Zinc, slabs	8.00c. to 9.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	13.75c.
Lead, American pig	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut	10.50c.
Antimony, Asiatic	14.50c.
Alum., virgin, 99 per cent plus	24.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, 1/2 and 1/2	36.50c. to 38.50c.
Babbitt metal, commercial grade	25.00c. to 65.00c.

\*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 3 1/4 per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent

#### From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	59.25c.
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Tin, bar	61.25c.
Copper, Lake	15.00c. to 15.25c.
Copper, electro-lytic	15.00c. to 15.25c.
Copper, castings	14.75c. to 15.00c.
Zinc, slabs	8.75c. to 9.00c.
Lead, American pig	6.50c. to 6.75c.
Lead, bar	10.00c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	23.25c.
Babbitt metal, high grade	63.25c.
Solder, 1/2 and 1/2	37.50c.

#### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	11.00c.	11.75c.
Copper, hvy. and wire	10.37 1/2c.	10.87 1/2c.
Copper, light and bottoms	9.37 1/2c.	9.62 1/2c.
Brass, heavy	6.25c.	6.875c.
Brass, light	5.00c.	5.75c.
Hvy. machine composition	9.37 1/2c.	9.87 1/2c.
No. 1 yel. brass turnings	7.37 1/2c.	7.87 1/2c.
No. 1 red brass or compos. turnings	9.00c.	9.50c.
Lead, heavy	4.75c.	5.12 1/2c.
Cast aluminum	12.12 1/2c.	13.25c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.75c.	4.12 1/2c.



# IRON AND STEEL SCRAP

*... All markets show weakness in continued absence of mill purchases.*

□ ○ □

*... Composite figure off 83c. to lowest point since Jan. 4.*

**M**AY 18.—The continued absence of buyers in most markets has weakened the market further, and THE IRON AGE composite figure has declined to \$17.92, the lowest since Jan. 4. No. 1 steel is off \$1 both at Pittsburgh and Philadelphia, and 50c. at Chicago. Small users on the fringe of the Chicago territory are quietly accumulating tonnages, and in other territories what mill buying is taking place is at consistently lower prices. A substantial tonnage of hydraulic bundles was sold at Pittsburgh at \$20, whereas another larger tonnage of No. 1 steel went to a mill at \$19. Fear of strikes is a new factor that is tending further to hold up mill orders.

There are no new developments in the export situation as far as new orders are concerned. Railroad embargoes are discouraging further buying, and at Boston heavy melting steel is again down \$1 a ton. Shipments are going forward to units of the European cartel and also to Japan, all on old orders.

## Pittsburgh

After continuing dull for some time, a good-sized tonnage of No. 1 steel has been sold into consumption at \$19 a ton, making the market quotable at \$18.50 to \$19, off \$1 a ton from last week's quotations. The continued absence of buyers and the fact that many dealers have been without orders are no doubt responsible for the further softening of the market. Railroad heavy melting steel has brought \$20.25 a ton recently, and it is reported that a fair tonnage of compressed sheets were sold into consumption last week at around \$20 a ton. Other sales of bundles, however, have sold below this figure. The present erratic condition in the scrap market precludes the maintenance of traditional differentials between grades.

## Chicago

New sales have disclosed new low prices as shown by heavy melting steel, which is now quotable at \$17 at the top. Incoming shipments are still

large, but they have passed the peak, and this factor may add strength to the market. A real key to a change in the attitude of buyers is that small users on the fringe of the Chicago area are quietly accumulating new tonnages. A cargo of cast iron wheels has reached Chicago from Duluth and other Lake shipments are scheduled for the near future. Movement from Chicago dock is slow because of revival of the local market for blast furnace grades, which were the principal ones stored for boat movement to Lake Erie.

## Cleveland

Danger that labor troubles will cause a shutdown of steel plants has caused the holding up of shipments to some mills in the Valley district and other consuming points. The market is inactive, as there is no new consumer demand and brokers have covered against their outstanding orders and are not making purchases. The market continues unsettled and weak. Quotations on both steel making and blast furnace grades are 50c. a ton lower. Steel-making scrap is also down 50c. a ton in the Valley district.

## Philadelphia

Inactivity rules this market. Several mills are taking occasional shipments on old orders, but no consumer is actively in the market for new supplies. At the same time, buying for export is at a standstill as a reflection of the railroad embargo at Port Richmond and in anticipation of the much higher car storage rates which go into effect on May 25. The result is that there is plenty of scrap around, and prices throughout the entire list are nominally 50c. to \$1 lower. Although No. 1 steel has not been sold into consumption at \$18.50, it is undoubtedly available at that figure. Breakable cast has been sold at \$18.50, and blast furnace grades are available at \$12.50 to \$13. General market sentiment regarding the future is that quotations will remain soft for several of the summer months and regain much of their past firmness early in the fall.

## Buffalo

The market for No. 1 and No. 2 heavy melting steel again has softened. It is true that one of the largest consumers recently purchased railroad scrap at around \$20.50, nevertheless it will not pay above \$18 for No. 1 and \$16.50 for No. 2 from dealers or in

small lots. A considerable tonnage has been acquired at these prices. It is probable that 10,000 to 15,000 tons could be bought, but the present strike situation, dealers say, plus a certain amount of scrap backing up from export shipments and operations slipping slightly, has all combined to weaken the market.

## Boston

Scrap prices are definitely lower throughout the list. Breakable cast for eastern Pennsylvania delivery is down about \$2 a ton from the recent peak. One consumer offers \$9 a ton on cars for steel turnings, but brokers cannot make shipments. Where they can ship, the market is \$8.25 to \$8.75 a ton on cars, off about \$1 from a week ago. Heavy melting steel quotations have been reduced about \$1.50 a ton, but the price means little because of a lack of buying. A consumer will shortly enter the market with offers \$2 to \$3 a ton under prices last paid. The export market for heavy melting steel is down another \$1 a ton, with holders scrambling to unload. In the past week 6800 tons left for Japan, and about 5000 tons for Wales. Three boats are now loading.

## New York

The market continues dull, and the almost complete absence of mill purchases or any developments in the export situation make it difficult to name prices, which may be considered nominal. Dealers are in wide disagreement as to buying prices, but the trend is downward. No. 1 and No. 2 steel are off 50c., partly in sympathy with the Philadelphia market. At least a half dozen ships are loading at Jersey City and Brooklyn docks with scrap for the European cartel, but the absence of new orders makes the export picture appear dull also.

## St. Louis

Prices of scrap iron in the St. Louis market continue their downward slide, the declines this week ranging from 25c. a ton to \$1.50 a ton. Mills are not buying, principally because they have large piles of material in their plants, and dealers are without orders. Further weakness is caused by the presence of considerable distress scrap.

## Cincinnati

The district scrap market is featureless. Market undertone is soft as mills back away from new commitments. Strikes in the steel industry are adding to dealers' quandary over present market conditions, and trading, even for yard supplies, is small. Railroads are offering good lists, but lack of dealer interest is expected to cause withdrawal or sales at lower figures than heretofore.

## Detroit

Still soft and unsupported, the local scrap market continued in its slump. A few sales have been made, but they only reflect the general downward tendency and in most cases are being made to cover old orders so they have no psychological effect of stiffening the market as outright new business would. Fisher's bundles sold at slightly over \$16, it is understood, but the sale was made nearly a week ago and the level now is lower.

# Iron and Steel Scrap Prices

## PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.50 to \$19.00
Railroad hvy. mltng. . .	19.75 to 20.25
No. 2 hvy. mltng. steel.	16.50 to 17.00
No. 2 RR. wrought . . .	18.50 to 19.00
Scrap rails . . . . .	20.50 to 21.00
Rails 3 ft. and under. . .	25.00 to 25.50
Comp. sheet steel . . . .	19.00 to 19.50
Hand bundled sheets. . .	17.00 to 17.50
Hvy. steel axle turn. . . .	17.00 to 17.50
Machine shop turn. . . . .	14.00 to 14.50
Short shov. turn. . . . .	15.00 to 15.50
Mixed bor. & turn. . . . .	14.00 to 14.50
Cast iron borings . . . . .	14.00 to 14.50
Cast iron carwheels . . . .	19.00 to 19.50
Hvy. breakable cast. . . . .	16.00 to 16.50
No. 1 cupola cast. . . . .	19.00 to 19.50
RR. knuckles & cplrs. . . .	25.25 to 25.75
Rail coil & leaf springs . .	25.25 to 25.75
Rolled steel wheels. . . . .	25.25 to 25.75
Low phos. billet crops. . . .	25.75 to 26.25
Low phos. sh. bar . . . . .	24.75 to 25.25
Low phos. punchings. . . . .	22.75 to 23.25
Low phos. plate, hvy. . . . .	24.25 to 24.75
Low phos. plate clip. . . . .	22.75 to 23.25
Steel car axles . . . . .	24.50 to 25.00

## CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.50 to \$18.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Comp. sheet steel . . . . .	17.00 to 17.50
Light bund. stampings. . . .	13.00 to 13.50
Drop forge flashings. . . . .	16.00 to 16.50
Machine shov. turn. . . . .	12.50 to 13.00
Short shov. turn. . . . .	12.50 to 13.00
No. 1 busheling . . . . .	16.50 to 17.00
Steel axle turnings. . . . .	14.00 to 14.50
Low phos. billet and bloom crops . . . . .	24.00 to 24.50
Cast iron borings . . . . .	12.50 to 13.00
Mixed bor. & turn. . . . .	12.50 to 13.00
No. 2 busheling . . . . .	12.50 to 13.00
No. 1 cast. . . . .	19.00 to 19.50
Railroad grate bars. . . . .	12.00 to 12.50
Stove plate . . . . .	10.00 to 10.50
Rails under 3 ft. . . . .	24.00 to 24.50
Rails for rolling . . . . .	21.50 to 22.00
Railroad malleable . . . . .	21.00 to 21.50
Cast iron carwheels. . . . .	22.50 to 23.00

## PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	16.50 to 17.00
Hydraulic bund. new. . . . .	18.00 to 18.50
Hydraulic bund. old. . . . .	15.50 to 16.00
Steel rails for rolling. . . . .	21.00 to 21.50
Cast iron carwheels . . . . .	21.00 to 21.50
Hvy. breakable cast. . . . .	18.00 to 18.50
No. 1 cast. . . . .	20.50 to 21.00
Stove plate (steel wks.) . . . .	15.00 to 15.50
Railroad malleable . . . . .	19.00 to 19.50
Machine shop turn. . . . .	13.50 to 14.00
No. 1 blast furnace . . . . .	12.00 to 12.50
Cast borings . . . . .	12.50 to 13.00
Heavy axle turnings. . . . .	16.50 to 17.00
No. 1 low phos. hvy. . . . .	25.00 to 25.50
Couplers & knuckles. . . . .	25.00 to 25.50
Rolled steel wheels . . . . .	25.00 to 25.50
Steel axles . . . . .	25.50 to 26.00
Shafting . . . . .	24.50 to 25.00
No. 1 RR. wrought . . . . .	19.50 to 20.00
Spec. iron & steel pipe . . . .	16.50 to 17.00
No. 1 forge fire . . . . .	16.00 to 16.50
Cast borings (chem.). . . . .	14.00 to 14.50

## CHICAGO

Delivered to Chicago district consumers:	
Per Gross Ton	
Hvy. mltng. steel. . . . .	\$16.50 to \$17.00
Auto. hvy. mltng. steel . . . .	15.50 to 16.00
Alloy free . . . . .	16.00 to 16.50
Shoveling steel . . . . .	16.50 to 17.00
Hydraul. comp. sheets. . . . .	16.00 to 16.50
Drop forge flashings. . . . .	15.00 to 15.50
No. 1 busheling . . . . .	15.50 to 16.00
Rolled carwheels . . . . .	20.00 to 20.50
Railroad tires, cut . . . . .	21.50 to 22.00
Railroad leaf springs. . . . .	21.00 to 21.50
Steel coup. & knuckles . . . .	20.00 to 20.50
Axle turnings . . . . .	16.50 to 17.00
Coil springs . . . . .	22.00 to 22.50
Axle turn. (elec.) . . . . .	17.50 to 18.00
Low phos. punchings. . . . .	20.50 to 21.00
Low phos. plates, 12 in. and under . . . . .	20.50 to 21.00
Cast iron borings . . . . .	10.50 to 11.00
Short shov. turnings. . . . .	11.00 to 11.50
Machine shop turn. . . . .	9.00 to 9.50
Rerolling rails . . . . .	21.50 to 22.00
Steel rails under 3 ft. . . . .	20.50 to 21.00
Steel rails under 2 ft. . . . .	21.50 to 22.00
Angle bars, steel . . . . .	20.00 to 20.50
Cast iron carwheels . . . . .	19.00 to 19.50
Railroad malleable . . . . .	19.50 to 20.00
Agric. malleable . . . . .	17.00 to 17.50
Iron car axles . . . . .	24.50 to 25.00

## Per Net Ton

Steel car axles . . . . .	\$22.50 to \$23.00
No. 1 RR. wrought . . . . .	15.00 to 15.50
No. 2 RR. wrought . . . . .	15.00 to 15.50
No. 2 busheling, old. . . . .	8.50 to 9.00
Locomotive tires . . . . .	18.00 to 18.50
Pipes and flues . . . . .	13.50 to 14.00
No. 1 machinery cast. . . . .	15.00 to 15.50
Clean auto. cast. . . . .	14.00 to 14.50
No. 1 railroad cast. . . . .	14.00 to 14.50
No. 1 agric. cast. . . . .	13.00 to 13.50
Stove plate . . . . .	12.00 to 12.50
Grate bars . . . . .	12.00 to 12.50
Brake shoes . . . . .	12.00 to 12.50

## BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
No. 2 hvy. mltng. steel.	16.25 to 16.75
Scrap rails . . . . .	19.00 to 19.50
New hvy. b'ndled sheet . . . .	16.25 to 16.75
Old hydraul. bundles . . . . .	15.25 to 15.75
Drop forge flashings . . . . .	16.25 to 16.75
No. 1 busheling . . . . .	16.25 to 16.75
Hvy. axle turnings. . . . .	13.50 to 14.00
Machine shop turn. . . . .	12.00 to 12.50
Knuckles & couplers. . . . .	21.00 to 21.50
Coil & leaf springs. . . . .	21.00 to 21.50
Rolled steel wheels. . . . .	21.00 to 21.50
Low phos. billet crops. . . . .	21.50 to 22.00
Shov. turnings . . . . .	13.00 to 13.50
Mixed bor. & turn. . . . .	11.00 to 11.50
Cast iron borings . . . . .	11.00 to 11.50
Steel car axles . . . . .	20.00 to 20.50
No. 1 machinery cast. . . . .	18.50 to 19.00
No. 1 cupola cast. . . . .	17.50 to 18.00
Stove plate . . . . .	14.00 to 14.50
Steel rails under 3 ft. . . . .	21.50 to 22.50
Cast iron carwheels. . . . .	17.00 to 17.50
Railroad malleable . . . . .	19.50 to 20.00
Chemical borings . . . . .	12.00 to 12.50

## BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel . . . . .	\$15.00 to \$17.00
Scrap steel rails . . . . .	17.00 to 19.00
Short shov. turnings. . . . .	9.00 to 10.00
Stove plate . . . . .	9.00 to 11.00
Steel axles . . . . .	18.00 to 19.00
Iron axles . . . . .	16.50 to 18.00
No. 1 RR. wrought. . . . .	13.00 to 15.00
Rails for rolling . . . . .	18.00 to 20.00
No. 1 cast . . . . .	16.00 to 18.00
Tramcar wheels . . . . .	16.00 to 18.00

## ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel. . . . .	\$16.75 to \$17.25
No. 1 hvy. melting . . . . .	14.50 to 17.00
No. 2 hvy. melting . . . . .	13.50 to 14.00
No. 1 locomotive tires. . . . .	20.00 to 20.50
Misc. stand.-sec. rails. . . . .	17.00 to 17.50
Railroad springs . . . . .	21.00 to 21.50
Bundled sheets . . . . .	11.00 to 11.50
No. 2 RR. wrought . . . . .	16.00 to 16.50
No. 1 busheling . . . . .	12.00 to 12.50
Cast bor. & turn. . . . .	7.50 to 8.00
Rails for rolling . . . . .	18.50 to 19.00
Machine shop turn. . . . .	9.00 to 9.50
Heavy turnings . . . . .	12.50 to 13.00
Steel car axles . . . . .	21.50 to 22.00
Iron car axles . . . . .	22.00 to 22.25
No. 1 RR. wrought . . . . .	13.50 to 14.00
Steel rails under 3 ft. . . . .	19.00 to 19.50
Steel angle bars . . . . .	19.25 to 19.75
Cast iron carwheels. . . . .	19.00 to 19.50
No. 1 machinery cast. . . . .	15.00 to 15.50
Railroad malleable . . . . .	19.00 to 19.50
No. 1 railroad cast. . . . .	14.00 to 14.50
Stove plate . . . . .	12.50 to 13.00
Agricul. malleable . . . . .	12.50 to 13.00
Grate bars . . . . .	12.00 to 12.50
Brake shoes . . . . .	13.00 to 13.50

## CINCINNATI

Dealer's buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.75 to \$15.25
No. 2 hvy. mltng. steel.	12.50 to 13.00
Scrap rails for mltng. . . . .	17.50 to 18.00
Loose sheet clippings. . . . .	10.50 to 11.00
Bundled sheets . . . . .	14.50 to 15.00
Cast iron borings . . . . .	8.00 to 8.50
Machine shop turn. . . . .	8.50 to 9.00
No. 1 busheling . . . . .	12.50 to 13.00
No. 2 busheling . . . . .	6.50 to 7.00
Rails for rollings . . . . .	20.00 to 20.50
No. 1 locomotive tires. . . . .	15.50 to 16.00
Short tails . . . . .	19.75 to 20.25
Cast iron carwheels. . . . .	14.50 to 15.00
No. 1 machinery cast. . . . .	14.00 to 14.50
No. 1 railroad cast. . . . .	14.25 to 14.75
Burnt cast. . . . .	9.50 to 10.00
Stove plate . . . . .	9.50 to 10.00
Agricul. malleable . . . . .	15.00 to 15.50
Railroad malleable . . . . .	16.25 to 16.75
Mixed hvy. cast. . . . .	12.00 to 12.50

## DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Borings and turnings. . . . .	10.25 to 10.75
Long turnings . . . . .	9.75 to 10.25
Short shov. turnings. . . . .	10.50 to 11.00
No. 1 machinery cast. . . . .	15.50 to 16.00
Automotive cast. . . . .	16.00 to 16.50
Hydraul. comp. sheets. . . . .	15.50 to 16.00
Stove plate . . . . .	9.50 to 10.00
New factory bushel. . . . .	14.00 to 14.50
Old No. 2 busheling. . . . .	10.00 to 10.50
No. 2 busheling (black fender stock) . . . . .	11.50 to 12.00
Sheet clippings . . . . .	10.50 to 11.00
Flashings . . . . .	14.00 to 14.50
Low phos. plate scrap. . . . .	16.00 to 16.50

## YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$19.00 to \$19.50
Hydraulic bundles . . . . .	18.50 to 19.00
Machine shop turn. . . . .	13.50 to 14.00

## NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hvy. breakable cast. . . . .	13.75 to 14.25
No. 1 machinery cast. . . . .	15.00 to 15.50
No. 2 cast. . . . .	14.00 to 14.50
Stove plate . . . . .	11.00 to 11.50
Steel car axles. . . . .	25.00 to 26.00
Shafting . . . . .	19.50 to 20.00
No. 1 RR. wrought. . . . .	17.00 to 17.50
No. 1 wrought long. . . . .	16.00 to 16.50
Spec. iron & steel pipe . . . . .	13.50 to 14.00
Rails for rolling. . . . .	18.50 to 19.00
Clean steel turnings . . . . .	9.00 to 9.50
Cast borings . . . . .	9.50 to 10.00
No. 1 blast furnace . . . . .	9.50 to 10.00
Cast borings (chem.) . . . . .	12.00 to 12.50
Unprepar. yard scrap. . . . .	9.00 to 9.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast. . . . .	\$17.50 to \$18.00
No. 1 hvy. cast cupola. . . . .	15.00 to 15.50
No. 2 cast . . . . .	14.50 to 15.00

## BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$13.80 to \$14.30
Scrap rails . . . . .	13.80 to 14.30
No. 2 steel . . . . .	12.75 to 13.25
Breakable cast. . . . .	13.10
Machine shop turn. . . . .	8.25 to 8.75
Mixed bor. & turn. . . . .	8.25 to 8.75
Bund. skeleton long. . . . .	11.50
Shafting . . . . .	18.00 to 18.50
Cast bor. chemical. . . . .	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast . . . . .	\$17.00 to \$19.00
No. 1 machine cast. . . . .	18.00 to 19.00
Stove plate . . . . .	10.00 to 10.50

## CANADA

Dealers' buying prices at their yards, per gross ton	
Toronto Montreal	
No. 1 hvy. mltng. stl.	\$13.50 \$13.00
No. 2 hvy. mltng. stl.	12.50 12.00
Mixed dealers steel. . . . .	12.00 11.75
Scrap pipe . . . . .	10.25 9.75
Steel turnings . . . . .	9.00 8.50
Cast borings . . . . .	9.75 9.50
Machinery cast . . . . .	17.50 17.00
Dealers cast . . . . .	15.50 15.00
Stove plate . . . . .	13.00 12.75

## EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel. . . . .	\$16.00
No. 2 hvy. mltng. steel. . . . .	15.00
No. 2 cast. . . . .	14.00
Stove plate . . . . .	\$11.00 to \$11.50

## Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel. . . . .	\$16.00
No. 2 hvy. mltng. steel. . . . .	15.00
Rails (scrap) . . . . .	16.00

## Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel. . . . .	\$18.50*
No. 2 hvy. mltng. steel. . . . .	17.00*

\* Nominal.

## New Orleans, f.a.s., Stuyvesant Dock

No. 1 hvy. mltng. steel. . . . .	\$17.50
No. 2 hvy. mltng. steel. . . . .	16.50

## Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles . . . . .	8.50 to 9.00

# PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

## SEMI-FINISHED STEEL

### Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton  
 Rerolling .....\$37.00  
 Forging quality ..... 43.00

### Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton  
 Open-hearth or Besse-  
 mer .....\$37.00

### Skelp

F.o.b. Pittsburgh, Chicago, Youngs-  
 town, Buffalo, Coatesville, Pa., Spar-  
 rows Point, Md.

Per Lb.  
 Grooved, universal and  
 sheared .....2.10c.

### Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton  
 F.o.b. Pittsburgh or Cleveland..\$47.00  
 F.o.b. Chicago, Youngstown or  
 Anderson, Ind. .... 48.00  
 F.o.b. Worcester, Mass. .... 49.00  
 F.o.b. Birmingham ..... 50.00  
 F.o.b. San Francisco ..... 56.00  
 F.o.b. Galveston ..... 53.00  
 Rods over 9/32 in. to 47/64 in., in-  
 clusive, \$5 a ton over base.

## BARS, PLATES, SHAPES

### Iron and Steel Bars

#### Soft Steel

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.45c.  
 F.o.b. Chicago or Gary ..... 2.50c.  
 F.o.b. Duluth ..... 2.60c.  
 Del'd Detroit ..... 2.60c.  
 F.o.b. Cleveland ..... 2.50c.  
 F.o.b. Buffalo ..... 2.55c.  
 Del'd Philadelphia ..... 2.74c.  
 Del'd New York ..... 2.78c.  
 F.o.b. Birmingham ..... 2.60c.  
 F.o.b. cars dock Gulf ports... 2.85c.  
 F.o.b. cars Pacific Ports..... 3.00c.

#### Rail Steel

(For merchant trade)

F.o.b. Pittsburgh ..... 2.30c.  
 F.o.b. Cleveland, Chicago, Gary  
 or Moline, Ill. .... 2.35c.  
 F.o.b. Buffalo ..... 2.40c.  
 F.o.b. Birmingham ..... 2.45c.  
 F.o.b. cars dock Gulf ports... 2.70c.  
 F.o.b. cars dock Pacific ports.. 2.85c.

#### Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh ..... 2.55c.  
 F.o.b. Buffalo, Cleveland,  
 Youngstown, Chicago, Gary  
 or Birmingham ..... 2.60c.  
 Del'd Detroit ..... 2.70c.  
 F.o.b. cars dock Gulf ports... 2.95c.  
 F.o.b. cars dock Pacific ports.. 2.95c.

#### Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh ..... 2.40c.  
 F.o.b. Buffalo, Cleveland,  
 Youngstown, Chicago, Gary  
 or Birmingham ..... 2.45c.  
 F.o.b. cars dock Gulf ports... 2.80c.  
 F.o.b. cars dock Pacific ports.. 2.80c.

### Iron

F.o.b. Chicago ..... 2.40c.  
 F.o.b. Pittsburgh (refined) .... 3.60c.

#### Cold Finished Bars and Shafting\*

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.90c.  
 F.o.b. Cleveland, Chicago and  
 Gary ..... 2.95c.  
 F.o.b. Buffalo ..... 3.00c.  
 F.o.b. Detroit ..... 2.95c.

\* In quantities of 10,000 to 19,999 lb.

### Plates

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.25c.  
 F.o.b. Chicago or Gary ..... 2.30c.  
 Del'd Cleveland ..... 2.435c.  
 F.o.b. Coatesville or Spar. Pt.. 2.35c.  
 Del'd Philadelphia ..... 2.435c.  
 Del'd New York ..... 2.53c.  
 F.o.b. Birmingham ..... 2.40c.

F.o.b. cars dock Gulf ports... 2.65c.  
 F.o.b. cars dock Pacific ports.. 2.80c.  
 Wrought iron plates, f.o.b.  
 Pittsburgh ..... 3.80c.

### Floor Plates

F.o.b. Pittsburgh ..... 3.80c.  
 F.o.b. Chicago ..... 3.85c.  
 F.o.b. Coatesville ..... 3.90c.  
 F.o.b. cars dock Gulf ports... 4.20c.  
 F.o.b. cars dock Pacific ports.. 4.35c.

### Structural Shapes

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.25c.  
 F.o.b. Chicago ..... 2.30c.  
 Del'd Cleveland ..... 2.435c.  
 F.o.b. Buffalo or Bethlehem... 2.35c.  
 Del'd Philadelphia ..... 2.455c.  
 Del'd New York ..... 2.5025c.  
 F.o.b. Birmingham (standard) 2.40c.  
 F.o.b. cars dock Gulf ports... 2.65c.  
 F.o.b. cars dock Pacific ports.. 2.80c.

### Steel Sheet Piling

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.60c.  
 F.o.b. Chicago or Buffalo ..... 2.70c.  
 F.o.b. cars dock Gulf or Pacific  
 Coast ports ..... 3.05c.

## RAILS AND TRACK SUPPLIES

### F.o.b. Mill

Standard rails, heavier than  
 60 lb., per gross ton .....\$42.50  
 Angle bars, per 100 lb. .... 2.80

### F.o.b. Basing Points

Light rails (from billets) per  
 gross ton .....\$43.00  
 Light rails (from rail steel) per  
 gross ton ..... 42.00

Base per Lb.  
 Snikes ..... 3.15c.  
 Tie plates, steel ..... 2.30c.  
 Tie plates, Pacific Coast ports.. 2.40c.  
 Track bolts, to steam railroads. 4.35c.  
 Track bolts, to jobbers, all sizes  
 (per 100 counts) .....

65-5 per cent off list  
 Basing points on light rails are Pittsburgh,  
 Chicago and Birmingham; on snikes and tie  
 plates, Pittsburgh, Chicago, Portsmouth, Ohio,  
 Wadon, W. Va., St. Louis, Kansas City,  
 Minnequa, Colo., Birmingham and Pacific Coast  
 ports; on tie plates alone, Steelton, Pa.,  
 Buffalo; on snikes alone, Youngstown, Lebanon,  
 Pa., Richmond, Va.

## SHEETS, STRIP, TIN PLATE

### TERNE PLATE

#### Sheets

#### Hot Rolled

Base per Lb.  
 No. 10, f.o.b. Pittsburgh ..... 2.40c.  
 No. 10, f.o.b. Gary ..... 2.50c.  
 No. 10, del'd Detroit ..... 2.60c.  
 No. 10, del'd Philadelphia ..... 2.69c.  
 No. 10, f.o.b. Granite City ..... 2.60c.  
 No. 10, f.o.b. Birmingham ..... 2.55c.  
 No. 10, f.o.b. cars dock Pacific  
 ports ..... 2.95c.  
 No. 10 wrought iron, Pgh. .... 4.25c.

#### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh ..... 3.15c.  
 No. 24, f.o.b. Gary ..... 3.25c.  
 No. 24, del'd Detroit ..... 3.35c.  
 No. 24, del'd Philadelphia ..... 3.44c.  
 No. 24, f.o.b. Granite City ..... 3.35c.  
 No. 24, f.o.b. Birmingham ..... 3.30c.  
 No. 24, f.o.b. cars dock Pacific  
 ports ..... 3.80c.  
 No. 24, wrought iron, Pitts-  
 burgh ..... 5.15c.

#### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh. 3.10c.  
 No. 10 gage, f.o.b. Gary ..... 3.20c.  
 No. 10 gage, f.o.b. Detroit ..... 3.30c.  
 No. 10 gage, del'd Philadelphia. 3.39c.  
 No. 10, f.o.b. Granite City ..... 3.30c.  
 No. 10 gage, f.o.b. Birmingham. 3.25c.  
 No. 10 gage, f.o.b. cars dock  
 Pacific ports ..... 3.70c.

#### Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.55c.  
 No. 20 gage, f.o.b. Gary ..... 3.65c.  
 No. 20 gage, del'd Detroit ..... 3.75c.  
 No. 20 gage, del'd Philadelphia. 3.84c.  
 No. 20, f.o.b. Granite City ..... 3.75c.  
 No. 20 gage, f.o.b. Birmingham. 3.70c.  
 No. 20 gage, f.o.b. cars, dock,  
 Pacific ports ..... 4.10c.

#### Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh. 3.80c.  
 No. 24, f.o.b. Gary ..... 3.90c.  
 No. 24, del'd Philadelphia ..... 4.09c.  
 No. 24, f.o.b. Granite City ..... 4.00c.

No. 24, f.o.b. Birmingham ..... 3.95c.  
 No. 24, f.o.b. cars, dock, Pacific  
 ports ..... 4.40c.  
 No. 24, wrought iron, Pitts-  
 burgh ..... 6.10c.

### Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.  
 Field grade ..... 3.35c.  
 Armature ..... 3.70c.  
 Electrical ..... 4.20c.  
 Special Motor ..... 5.10c.  
 Special Dynamo ..... 5.80c.  
 Transformer ..... 6.30c.  
 Transformer Special ..... 7.30c.  
 Transformer Extra Special ..... 7.80c.

Base gage changed from 28 to 24 gage. Gage  
 extras are the same as those applying on hot-  
 rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus sil-  
 icon sheet extra width extras plus 25c. per 100  
 lb. for coils.

### Long Ternes

No. 24, unassorted 8-lb. coating  
 f.o.b. Pittsburgh ..... 4.10c.  
 F.o.b. Gary ..... 4.20c.  
 F.o.b. cars, dock, Pacific ports 4.80c.

### Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh ..... 3.50c.  
 No. 20, f.o.b. Gary ..... 3.60c.  
 No. 20, f.o.b. Granite City ..... 3.70c.  
 No. 20, f.o.b. cars dock Pacific  
 ports ..... 4.10c.

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per  
 lb. .... 3.30c.  
 No. 28, Gary ..... 3.40c.  
 No. 28, f.o.b. Granite City ..... 3.50c.  
 No. 28, cars dock Pacific ports,  
 boxed ..... 4.175c.

### Tin Plate

Base per Box  
 Standard cokes, f.o.b. Pitts-  
 burgh district mill .....\$5.35  
 Standard cokes, f.o.b. Gary..... 5.45  
 Standard coke, f.o.b. Granite  
 City ..... 5.55

Above quotations practically the  
 equivalent of previous quotations  
 owing to new method of quoting,  
 effective Jan. 1, 1937.

### Special Coated Manufacturing Ternes

Base per Box  
 F.o.b. Pittsburgh .....\$4.65  
 F.o.b. Gary ..... 4.75  
 F.o.b. Granite City ..... 4.85

\* Customary 7½ per cent discount in effect  
 through 1936 discontinued as of Jan. 1, 1937.

### Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)  
 8-lb. coating I.C. ....\$11.00  
 15-lb. coating I.C. .... 13.00  
 20-lb. coating I.C. .... 14.00  
 25-lb. coating I.C. .... 15.00  
 30-lb. coating I.C. .... 16.25  
 40-lb. coating I.C. .... 18.50

### Hot-Holed Hoops, Bands, Strip and Flats under ¼ In.

Base per Lb.  
 All widths up to 24 in., Pitts-  
 burgh ..... 2.40c.  
 All widths up to 24 in., Chicago 2.50c.  
 All widths up to 24 in., del'd  
 Detroit ..... 2.60c.  
 All widths up to 24 in., Granite  
 City ..... 2.60c.  
 All widths up to 24 in.,  
 Birmingham ..... 2.55c.  
 Cooperage stock, Pittsburgh... 2.50c.  
 Cooperage stock, Chicago .... 2.60c.

### Cold-Rolled Strip\*

Base per Lb.  
 F.o.b. Pittsburgh ..... 3.20c.  
 F.o.b. Cleveland ..... 3.20c.  
 Del'd Chicago ..... 3.48c.  
 F.o.b. Worcester ..... 3.40c.

\* Carbon 0.25 and less.

### Cold Rolled Spring Steel

Pittsburgh  
 and  
 Cleveland Worcester  
 Carbon 0.25-0.50% 3.20c. 3.40c.  
 Carbon .51-.75 4.45c. 4.65c.  
 Carbon .76-1.00 6.30c. 6.50c.  
 Carbon Over 1.00 8.50c. 8.70c.

### Fender Stock

No. 14, Pitts'gh or Cleveland 3.45c.  
 No. 20, Pitts'gh or Cleveland. 3.85c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

### To Manufacturing Trade

	Per Lb.
Bright wire .....	2.90c.
Spring wire .....	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.	

### To the Trade

	Base per Keg
Standard wire nails .....	\$2.75
Smooth coated nails .....	\$2.75
Cut nails, carloads .....	\$3.60

### Base per 100 Lb.

Annealed fence wire .....	\$3.20
Galvanized fence wire .....	3.60
Polished staples .....	3.45
Galvanized staples .....	3.70
Barbed wire, galvanized .....	3.40
Twisted barbed wire .....	3.40
Woven wire fence, base column. 74	
Single loop bale ties, base col....	63

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are 3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

## STEEL AND WROUGHT IRON PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Steel	Butt Weld	Wrought Iron
In.	Black Galv.	In. Black Galv.
1/8 .....	1/8 & 3/8 .....	1/8 & 3/8 .....
1/4 to 3/8 .....	1/4 .....	1/4 .....
1/2 .....	1/2 .....	1/2 .....
3/4 .....	3/4 .....	3/4 .....
1 to 3 .....	1 to 3 .....	1 to 3 .....

	Lap	Weld		
2 .....	47½	2 .....	26½	10
2½ & 3.60	50½	2½ to 3½	27½	12½
3½ to 6.62	52½	4 .....	29½	16
7 & 8.61	50½	4½ to 8.	28½	15
9 & 10.60½	50	9 to 12.	24½	10
11 & 12.59½	49			

11 & 12.....	5 1/2	48		
<b>Butt Weld, extra strong, plain ends</b>				
1/8 .....	50 1/2	36 1/2	1/4 & 3/8 ..	+14 +48
1/4 to 3/8 ..	52 1/2	40 1/2	1/2 .....	21 4
1/2 .....	57 1/2	48 1/2	3/4 .....	27 10
3/4 .....	61 1/2	52 1/2	1 to 2..	34 17 1/2
1 to 3....	63	55		

Lap Weld, extra strong, plain ends	
2.....55	46½
2½ & 3..59	50½
3½ to 6..62½	54
7 & 8..61½	51
9 & 10..60½	50
11 & 12..59½	49
2.....29½	13½
2½ to 4..35	20½
4½ to 6..33½	19
7 & 8..34½	19½
9 to 12..28	15½

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

Seamless Steel Commercial Roller Tubes and Locomotive Tubes (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. ....	13 B.W.G. \$ 9.46	\$ 8.41
1 1/4 in. o.d. ....	13 B.W.G. 11.21	9.96
1 1/2 in. o.d. ....	13 B.W.G. 12.38	11.00
1 3/4 in. o.d. ....	13 B.W.G. 14.09	12.51
2 in. o.d. ....	13 B.W.G. 15.78	14.02
2 1/4 in. o.d. ....	13 B.W.G. 17.60	15.63
2 1/2 in. o.d. ....	12 B.W.G. 19.37	17.21
2 3/4 in. o.d. ....	12 B.W.G. 21.22	18.85
3 in. o.d. ....	12 B.W.G. 22.46	19.98
3 1/4 in. o.d. ....	12 B.W.G. 23.60	20.97
3 1/2 in. o.d. ....	10 B.W.G. 45.19	40.15
3 3/4 in. o.d. ....	11 B.W.G. 29.79	26.47
4 in. o.d. ....	10 B.W.G. 36.96	32.83
5 in. o.d. ....	9 B.W.G. 56.71	50.38
6 in. o.d. ....	7 B.W.G. 87.07	77.35

### Extra for less-carload quantities:

12,000 lb. or ft. to	24,999 lb. or ft.	12½ %
6,000 lb. or ft. to	11,999 lb. or ft.	25 %
2,000 lb. or ft. to	5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.		50 %

## CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago..	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham..	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	56.00
F.o.b. dock, Seattle.....	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles .....	59.00
F.o.b. dock, Seattle .....	59.00

Class "A" and gas pipe, \$3 extra. 4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41. Birmingham, and \$49.50, delivered Chicago; and 4-in. pipe, \$44. Birmingham, and \$2.40 a ton, delivered Chicago.

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

### Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller..	65 and 5*
Larger and longer up to	
1 in. ....	60 and 10*
1 1/4 in. and larger.....	60 and 5*
Lag bolts .....	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7 .....	65 and 5
Hot pressed nuts, and 2-p.c. and t nuts, square or hex, blank or tapped:	
1/2 in. and smaller .....	65
9/16 in. to 1 in. inclusive....	60 and 5
1 1/4 in. and larger .....	60

Jobbers discount on above items, 5 per cent.

\* Less carload lots and less than full container quality. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller .....	60 and 10
9/16 in. to 1 in. inclusive..	60 and 5
1 1/4 in. and larger .....	60
Stove bolts in packages, nuts attached .....	72 1/2
Stove bolts in packages, with nuts separate .....	72 1/2 and 5
Stove bolts in bulk.....	81 1/2

On stove bolts freight is allowed to destination on 200 lb. and over.

### Large Rivets

(1/2-in. and larger)

### Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland..\$3.60  
F.o.b. Chicago or Birmingham.. 3.70

### Small Rivets

(7/16-in. and smaller)

### Per Cent Off List

F.o.b. Pittsburgh .....	65 and 5
F.o.b. Cleveland .....	65 and 5
F.o.b. Chicago and Birmingham .....	65 and 5

### Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

### Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 1/4 in. and smaller.....	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller .....	60
Upset set screws, cup and oval points .....	75
Milled studs .....	65

## Alloy and Stainless Steel

### Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$60 a gross ton.

### Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base .....3.00c. Delivered, Detroit .....

# IRON AND STEEL WAREHOUSE PRICES

## PITTSBURGH\*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.

Per Cent Off List  
Track bolts, all sizes, per 100 count 55  
Machine bolts, 100 count ..  
Carriage bolts, 100 count ..  
Nuts, all styles, 100 count ..  
Large rivets, base per 100 lb. \$4.35  
Wire, black, soft ann'l'd, base per 100 lb. 3.45c.  
Wire, galv. soft, base per 100 lb. 3.85c.  
Common wire nails, per keg. 3.00c.  
Cement coated nails, per keg. 3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.  
\*Delivered in Pittsburgh switching district.  
\*\*Prices on application.

## CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

Per Cent Off List  
Machine bolts .. 60  
Carriage bolts .. 60  
Lag screws .. 55 and 5  
Hot-pressed nuts, sq. tap or blank .. 60  
Hot-pressed nuts, hex. tap or blank .. 60  
Hex. head cap screws .. 60  
Cut point set screws .. 75  
Flat head bright wood screws 62 and 20  
Spring cotters .. 45  
Stove bolts in full packages .. 72½  
Rd. hd. tank rivets, 7/16 in. and smaller .. 55  
Wrought washers .. \$4.00 off list  
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier) .. \$4.55  
Com. wire nails, 15 kegs or more, per keg .. \$3.20  
Cement c'd nails, 15 kegs or more, per keg .. \$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.  
\*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

## NEW YORK

	Base per Lb.
Plates, ½ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. char-coal	6.50 to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00 to 5.72c.
Long terme sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ½ in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

Per Cent Off List  
Machine bolts, square head and nut:  
All diameters. Prices on application  
Carriage bolts, cut thread:  
All diameters. Prices on application  
\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.  
†125 lb. and more.

## ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

Per Cent Off List  
Tank rivets, 7/16 in. and smaller. 55  
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities 65

\*No. 26 and lighter take special prices.

## PHILADELPHIA

	Base Per Lb.
*Plates, ½-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, ¼ in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

\*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.  
†For less than 2000 lb.

## CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List  
Machine and carriage bolts, small 65 and 5  
Large 60 and 10  
Nuts, 100 count ½ in. and smaller 65 and 5  
¾ in. to 1 in. 60 and 10

†Outside delivery 10c. less.

\*For 5000 lb. or less.  
† Plus switching and cartage charges and quantity differentials up to 50c.

## CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg: Any quantity less than carload. 3.04 Cement c'd nails, base 100-lb. keg 3.50 Chain. lin. per 100 lb. 8.35	

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	\$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

## BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg. 37.26 Black wire, base per 100 lb. (2500-lb lots or under) 4.55c. (Over 2500 lb.) 4.45c.	

## BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern.	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

## DETROIT

	Base per Lb.
Soft steel bars .....	3.94c.
Structural shapes .....	3.95c.
Plates .....	3.95c.
Floor plates .....	5.85c.
Hot-rolled annealed sheets	
(No. 24)* .....	4.69c.
Hot-rolled sheets (No. 10) .....	3.94c.
Galvanized sheets (No. 24)* .....	5.40c.
Bands and hoops .....	4.19c.
Cold-finished bars .....	4.30c.
Cold-rolled strip .....	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series) .....	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

\* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

## MILWAUKEE

	Base per Lb.
Plates and structural shapes ..	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles ..	3.96c.
Soft steel bars, squares and hexagons ..	4.11c.
Hot-rolled strip ..	4.21c.
Hot-rolled annealed sheets (No. 24) ..	4.71c.
Galvanized sheets (No. 24) ..	5.36c.
Cold-finished steel bars ..	4.41c.
Structural rivets (keg lots) ..	4.71c.
Boiler rivets, cone head (keg lots) ..	4.81c.
Track spikes (keg lots) ..	4.26c.
Track bolts (keg lots) ..	5.71c.
Black annealed wire (No. 6 to No. 9 incl.) ..	4.66c.
Com. wire nails and cement coated nails	
1 to 14 kegs ..	3.31c.

	Per Cent Off List
Machine bolts and carriage bolts, 1/2x6 and smaller .....	.65-10
Larger .....	.65
Coach and lag screws .....	.65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots) .....	.65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

## ST. PAUL

	Base per Lb.
Mild steel bars, rounds .....	4.10c.
Structural shapes .....	4.00c.
Plates .....	4.00c.
Cold-finished bars .....	4.55c.
Hot-rolled annealed sheets, No. 24 .....	4.85c.
Galvanized sheets, No. 24 .....	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

## BALTIMORE

	Base per Lb.
Mild steel bars and small shapes .....	4.00c.
Structural shapes .....	3.90c.
Reinforcing bars, 5 to 15 tons ..	3.11c.
Plates .....	3.90c.
Hot-rolled sheets, No. 10 .....	3.95c.
Bands .....	4.20c.
Hoops .....	4.45c.
Special threading steel .....	4.15c.
Checkered floor plates 1/4 in. and heavier .....	5.80c.
Galvanized sheets, No. 24, 100 bdis. or more .....	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more .....	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

## CHATTANOOGA

	Base per Lb.
Mild steel bars .....	3.96c.
Iron bars .....	3.96c.
Reinforcing bars .....	3.96c.
Structural shapes .....	4.01c.
Plates .....	4.01c.
Hot-rolled sheets No. 10 .....	3.91c.
Hot-rolled annealed sheets, No. 24* .....	4.06c.
Galvanized sheets No. 24* .....	4.76c.
Steel bands .....	4.16c.
Cold-finished bars .....	4.86c.

\* Plus mill item extra.

## MEMPHIS

	Base per Lb.
Mild steel bars .....	4.31c.
Shapes, bar size .....	4.31c.
Iron bars .....	4.31c.
Structural shapes .....	4.21c.
Plates .....	4.21c.
Hot-rolled sheets, No. 10 .....	4.26c.
Hot-rolled annealed sheets, No. 24 .....	4.91c.
Galvanized sheets, No. 24 .....	5.66c.
Steel bands .....	4.56c.
Cold-drawn rounds .....	4.80c.
Cold-drawn flats, squares, hexagons .....	6.30c.
Structural rivets .....	4.35c.
Bolts and nuts, per cent off list ..	55
Small rivets, per cent off list ..	60

## NEW ORLEANS

	Base per Lb.
Mild steel bars .....	4.20c.
Reinforcing bars .....	3.14c.
Structural shapes .....	4.10c.
Plates .....	4.10c.
Hot-rolled sheets, No. 10 .....	4.10c.
Steel bands .....	4.75c.
Cold-finished steel bars .....	5.10c.
Structural rivets .....	4.25c.
Boiler rivets .....	4.25c.
Common wire nails, base per keg .....	\$3.30
Bolts and nuts, per cent off list ..	65

## PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M. ....	4.05c.	4.30c.	4.25c.
Shapes, standard ..	4.05c.	4.30c.	4.25c.
Soft steel bars ..	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports ..	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24) .....	5.15	5.05c.	5.35c.
Hot-rolled sheets (No. 10) .....	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter) ..	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier) ..	6.10c.	5.70c.	5.90c.
Cold-finished steel			
Rounds .....	6.80c.	6.85c.	7.10c.
Squares and hexagons ..	8.05c.	8.10c.	7.10c.
Flats .....	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload ..	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

## REFRACTORIES PRICES

## Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois .....	\$54.00
First quality, New Jersey .....	56.00
Select, Ohio .....	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois .....	49.00
Second quality, New Jersey ..	51.00
No. 1, Ohio .....	46.00
Ground fire clay, per ton .....	8.00
5 per cent trade discount on fire clay brick.	

## Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania .....	\$54.00
Chicago District .....	63.00
Birmingham .....	54.00
Silica cement per net ton (Eastern) .....	9.50
5 per cent trade discount on silica brick.	

## Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester ..	\$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. ....	49.00

## Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa. ....	\$69.00
Chemically bonded, f.o.b. Baltimore .....	59.00

## Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks) .....	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks .....	43.00
Domestic, f.o.b. Chewelah, Wash. ....	25.00

## RAW MATERIALS PRICES

### PIG IRON

#### No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

\* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

#### Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

#### Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

#### Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
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#### Gray Forge

Valley or Pittsburgh furnace	\$23.50
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#### Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

#### Canadian Pig Iron

##### Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

##### Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

### FERROALLOYS

#### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.	
Per Gross Ton	
Domestic, 80% (carload)	\$102.50

#### Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$33.00
F.o.b. New Orleans	33.00

#### Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

#### Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.  
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.  
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

#### Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

#### Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.70
Ferrotungsten, lots of 5000 lb.	\$1.75
Ferrotungsten, smaller lots	\$1.80
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

### ORES

#### Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

#### Foreign Ore

##### C.i.f. Philadelphia or Baltimore

##### Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	45c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

##### Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$22.00 to \$24.00
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	25.00
Turkish, 48-49%	24.50 to \$25.00
Turkish, 45-46%	20.50 to 21.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	21.50
48-49%	24.50 to 25.00

### FLUORSPAR

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$19.00 to \$20.00
Domestic, barge and rail	\$19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$20.00 to 21.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

### FUEL OIL

##### Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.35c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

### COKE AND COAL

##### Coke Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt	\$4.60 to \$4.75
Foundry, f.o.b. Connells-ville, Prompt	5.25 to 6.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

##### Coal Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

## ...BOSTON...

### ... Pig iron sales small and for early shipment.

BOSTON, May 18.—Further small pig iron tonnages were sold the past week for prompt and nearby delivery. Interest among furnace representatives, however, centered in rounding up prospects for third quarter business. Opinion is there will be some buying in June, but that it will be well into July before business is in full swing. A sizable tonnage is anticipated. The iron situation, so far as steel mills are concerned, is not as tight as heretofore.

Construction work has slumped noticeably this month and, as a result, steel fabricators and reinforcing steel bar houses have less to figure on than in months. Most of the current labor unrest is in the textile and shoe manufacturing industries. Steel interests are having little trouble at the moment. Production of cast iron pipe is holding recent gains.

## ..SAN FRANCISCO..

### ... Construction projects are more numerous.

o o o

### ... Proposed water line would cost \$8,000,000.

SAN FRANCISCO, May 17.—Bids will be opened June 16 on the San Francisco Railway Facilities Terminal of the San Francisco-Oakland Bay bridge. The project calls for approximately 2500 tons of reinforcing steel and 2840 tons of structural shapes in addition to smaller quantities of other steel products. On June 9 bids will be opened by the San Francisco Public Utilities Commission on about 1800 tons of reinforcing bars to be used in the construction of Sunset Reservoir.

Plans for a rural electrification

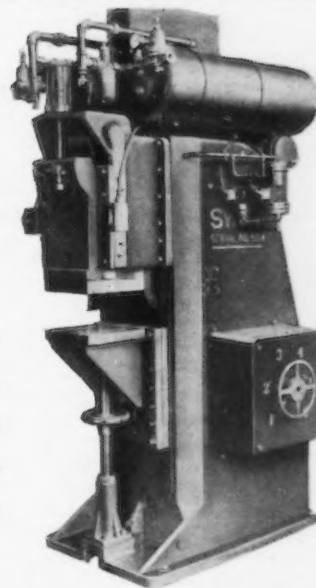
and irrigation and reclamation project for a number of counties in southern Idaho have been submitted to the U. S. Bureau of Reclamation. If this proposal is accepted, water will be diverted from Yellowstone Lake through a tunnel to a dam to be constructed on the Snake River. Estimated cost is \$8,000,000.

Structural steel lettings last week far outdistanced the rest of the market. Metro-Goldwyn-Mayer Studios awarded 450 tons of shapes

to Consolidated Steel Co. Wisconsin Bridge & Iron Co. took 250 tons for the Del Rey bridge at Los Angeles. Aggregate awards were 1750 tons. No reinforcing awards over 100 tons were reported, though numerous small jobs maintained activity. In spite of considerable demand in other sections of the country, the plate market on the Pacific Coast has been almost entirely inactive since price advances went into effect March 1.

## SWIFT No. 19 PROJECTION WELDING MACHINE with 350 KVA transformer

An air operated toggle linkage delivers the two stage welding pressure, a low pressure for heating and a high pressure for upsetting. This operation materially reduces peak current demands.



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*Welding machines hand, hydraulic, cam or air operated of the following types: spot, seam, projection, flash, butt, flue and pipe, and gun welding units.*



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Close Precision

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Sturdy Construction

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An excellent type of instrument for executives and engineers.

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and Distributors  
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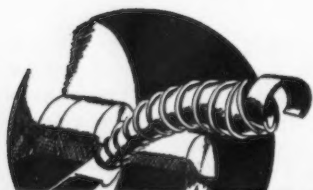
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Our shop with skilled Technicians is at your disposal for quick and economical repairs on all types of Timers and Instruments.

**M. J. STILLMAN CO., INC., 116 So. Michigan Avenue, Chicago, Ill.**



Plain



## THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... May business expected to be lower than that of April.

...

... Prospects are still numerous, however, and backlogs are large.

...

... Nash-Kelvinator to spend \$1,500,000; General Electric buys many presses.

### Cleveland

ACTIVITY in machine tools, both in orders and inquiries, declined the past week, and May business is expected to show considerable falling off as compared with April. No inquiries of any size are pending. Strikes and possibility of strikes have affected the volume of business in this immediate territory, and the shipment of some machines has been held up because of labor troubles. Many metal working plants, wanting tools for immediate use, have turned to used machinery because they cannot get early deliveries on new machines.

### Detroit

ONE \$75,000 order for gear bur-nishing equipment was placed in Detroit recently, and drilling equipment is experiencing a heavy run. A new factor in the machinery market is the accessory plant which will be built by General Motors at Rochester, N. Y. The plant will have 400,000 sq. ft. of floor space, and will employ 3000 men. Hupmobile is talking with machine specialty men, but as far as can be determined has not bought or even inquired for anything yet. However, the cars that are in prospect for 1938 will require some special tooling

and new machinery. Meanwhile business is forcing many firms to expand, Detroit Broach Co. having just doubled its capacity, and James W. George, specializing in tools and machinery, having enlarged his firm's quarters three times in the last three years. Die shops, however, are in a serious state, a typical shop normally employing 150 men now has 30 on the job. Hope is still held out that retooling programs of some scale will be released soon.

### Pittsburgh

INQUIRIES have slowed up some in the past week. Part of this leveling off is attributable to the labor outlook in the steel industry. On the other hand, it was expected that a reaction would set in following abnormally high activity in April. Practically all dealers are receiving a fair volume of commitments, however. General Electric Co., Erie, Pa., has placed orders for 70 to 80 presses.

### Cincinnati

THE demand curve in this area showed an upward trend the past week, as miscellaneous ordering recovered from the slight decline of the previous period. Retooling requirements of automobile manufacturers are going forward at good rate, and millers, grinders, broachers and lathes are particularly active. The slack of the last week in drill demand was offset somewhat the past week, and the market is near to recent peak activity. Inquiries are steadily coming in, making prospects bright.

### Chicago

DEALERS are feeling more and more the effects of unsettled labor conditions. Within recent weeks buyers in Milwaukee have stepped aside to watch developments as to spotty, but nevertheless disturbing, labor controversies. The impression has gained ground that summer sales will decline, but order books are heavy and machine tool builders will have little to worry about. In one respect buyers' minds are eased because they find that the rapid machine tool price rise apparently has come to an end. Nash-Kelvinator will spend \$1,500,000 for improvements at its Wisconsin properties.

### New York

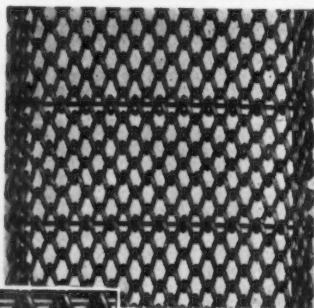
NEW orders and inquiries are being maintained in surprisingly good volume after a peak month. Demand is coming from a variety of sources. General Motors' large buying program for parts plants in Syracuse and Rochester is being handled locally, and dealers with branch offices in those cities report a flood of orders. Deliveries are called for by Sept. 1. The suddenness with which the program was launched is puzzling some of the machine tool manufacturers as to how they will adjust their already crowded schedules to accommodate. Some are committed to the first of the year.

# WISSCO

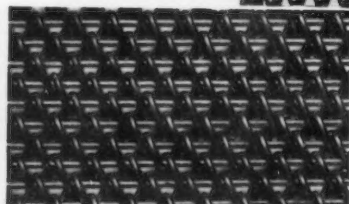
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Handbook. It  
gives you valuable  
money saving  
data.





# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**Seagram Distillers Corp.**, 405 Lexington Avenue, New York, affiliated with Joseph E. Seagram Sons, Inc., same address, plans one and multi-story addition to distilling plant at Louisville, primarily for a mechanical-bottling unit. Cost close to \$1,000,000 with equipment. Harry Bronfman is director of production and construction at Louisville plant.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until May 25 for two motor-driven turret lathes (Schedule 721), one motor-driven boring, drilling, milling and draw-out traveling head planer machine (Schedule 703); until May 28, two exhaust mufflers for auxiliary engines, two exhaust mufflers and gas-heated evaporators combined, and auxiliary engine exhaust and spare parts (Schedule 733) for Brooklyn Navy Yard; air-cooling and air-conditioning plants (Schedule 745) for Brooklyn and Philadelphia yards.

**Department of Sanitation**, 125 Worth Street, New York, has taken out permit for two-story service, repair and garage building, 185 x 269 ft., at Zerega and Lafayette Avenues, Bronx, for department motor trucks and cars. Cost about \$500,000 with equipment. Harrison & Foulhoux, 45 Rockefeller Plaza, are architects.

**American Can Co.**, 230 Park Avenue, New York, has acquired tract on Sixty-first Street, near Western Avenue, Chicago, 250 x 625 ft., for new one and multi-story factory branch, storage and distributing plant, for which plans will be drawn soon. Cost about \$450,000 with equipment.

**Phelps-Dodge Corp.**, 40 Wall Street, New York, operating copper ore and other mining properties, has authorized an expansion and development program at various mines and mills, with gross expenditure about \$23,000,000. Primary work will include new mill units and machinery at Copper Queen mining properties, Bisbee, Ariz., to cost \$2,500,000, and for like expansion at Cornelia mines, Ajo, Ariz., to cost \$4,172,000. At its United Verde properties, Jerome, Ariz., company will expend approximately \$960,000 for additional mills and machinery; an appropriation of \$2,760,000 will be used for development of clay ore and mineral properties at Morenci, Ariz., including several large mill units and installation of mining and refining machinery, with storage and distribution facilities. For expansion in fabricating plants, operated under name of Phelps-Dodge Copper Products Corp., a fund of \$3,500,000 will be used for new mill units and machinery, including replacements in certain present equipment; about \$885,000 has been appropriated for expansion and betterments in other mills and operating properties. Company has approved financing through sale of bonds and stocks to provide gross sum noted.

**General Electric Co.**, Schenectady, N. Y., has plans for one-story factory branch, storage and distributing plant at San Diego, Cal., 100 x 100 ft., to cost over \$65,000 with equipment. H. Louis Bodmer, Commonwealth Building, San Diego, is architect.

**Board of Education**, Park Avenue and Fifty-ninth Street, New York, plans manual training department in new four-story high school, 190 x 420 ft., to occupy block front on Thirty-first Avenue, Forty-eighth to Forty-ninth Streets, Astoria, Queens, for which building permit has just been issued. Cost about \$2,000,000. Walter C. Martin, Flatbush Avenue Extension and

Concord Street, Brooklyn, is architect for board.

**Harrison Bolt & Nut Co.**, 207 Railroad Avenue, Harrison, N. J., has plans for two-story addition, 50 x 100 ft. Cost about \$50,000 with equipment. Joseph W. Baker, 111 North Fourth Street, is architect.

**Newark Mfg. & Engineering Co., Inc.**, 829 Newark Avenue, Elizabeth, N. J., manufacturer of special machinery and parts, has acquired tract, 186 x 250 ft., on Chestnut Avenue, Hillside, N. J., for new one-story plant, about 10,000 sq. ft. floor space; superstructure to begin soon. Cost over \$40,000 with equipment.

**Sun Machinery Co.**, 35 Van Buren Street, Newark, N. J., has leased one-story building at Hanford and Van Vechten Streets for new plant, removing present works to new location and increasing capacity.

**Commanding Officer**, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until May 24 for one extensometer (Circular 694); until May 26, one, two or three automatic screw machines for steel ores (Circular 633), one set each class A and B gaging blocks and one set of accessories (Circular 701); until May 27 for one caliber .45 gaging machine (Circular 634).

**Keebler-Weyl Baking Co.**, 260 North Twenty-second Street, Philadelphia, has let general contract to Turner Construction Co., Architects' Building, for new baking plant at G Street and Hunting Park Avenue, comprising two two-story units, each 162 x 501 ft. Cost about \$500,000 with traveling ovens, conveyers, loaders and other mechanical equipment. Clarence E. Wunder, Architects' Building, is architect.

**Yarnall-Waring Co.**, Philadelphia, is completing an extension, 80 x 80 ft., to its Chestnut Hill plant to provide increased facilities for manufacture of Yarrow steam specialties.

**Thatcher Furnace Co.**, Newark, maker of boilers, furnaces and air conditioners, has announced removal of all sheet-metal-working activity from its Newark plant to its branch at Garwood, N. J., where henceforth all manufacturing operations will be centered. General offices will remain at Newark. Resumption of operations is expected at Garwood by June 1. The only change in personnel to be brought about by this move is appointment of Gordon Cheasley as plant manager. Charles Weiss continuing as superintendent.

## ◀ NEW ENGLAND ▶

**Cuno Engineering Corp.**, South Vine Street, Meriden, Conn., manufacturer of automobile equipment, industrial filters and allied products, has asked bids on general contract for two-story addition, 45 x 98 ft. Cost over \$45,000 with equipment. Lorenzo Hamilton, Meriden, is architect; Kenwood Associates, 137 Colony Street, are consulting engineers.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until May 25 for two 20-in. hydraulic shapers, with motor, work vise, universal table, etc. (Schedule 722); until June 1, twist drills (Schedule 730) for Boston Navy Yard.

**Thompson Wire Co.**, 41 Mildred Avenue, Boston, has let general contract to Clark & Smith, Inc., 1372 Hancock Street, for two-story addition, 54 x 60 ft., for expansion in annealing division. Cost close to \$50,000 with equipment.

**Pitney-Bowes Postage Meter Co.**, Pacific Street, Stamford, Conn., has let general contract to Turner Construction Co., 420

Lexington Avenue, New York, for three-story addition, 54 x 180 ft. Cost over \$100,000 with equipment. Howard Chapman, Stamford, is architect.

**Commanding Officer**, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until June 7 for two combination contour metal sawing, filing and polishing machines (Circular 251); until June 3, one thread milling machine (Circular 249).

## ◀ BUFFALO DISTRICT ▶

**Harrison Radiator Corp.**, Washburn and Walnut Streets, Lockport, N. Y., a division of General Motors Corp., has acquired about 65 acres in vicinity of Upper Mountain Road, near Lockport city limits, for new plant. Initial unit will comprise main two-story building, 356 x 520 ft., for production of car heaters, car exchangers, thermostats and kindred heating specialties. Cost close to \$500,000 with equipment. Frank M. Hardiman is general manager.

**General Motors Corp.**, Detroit, has plans for new works on 66-acre tract at Rochester, N. Y., recently purchased, for production of automobile parts and accessories for Eastern assembling plants, including fuel pumps, starters and brake equipment, air cleaners, speedometers and similar specialties. Plant is scheduled for completion early in 1938. Cost over \$1,000,000 with machinery.

## ◀ SOUTH ATLANTIC ▶

**Southern Cotton Oil Co.**, Canal Bank Building, New Orleans, plans new cottonseed oil mill near fertilizer plant at Goulding, Fla. Initial installation will include eight presses with crushers, refining machinery and auxiliary equipment. Cost close to \$75,000 with equipment.

**United States Engineer Office**, Jacksonville, Fla., asks bids until May 24 for one cast steel ball and socket joint, one cast steel trunnion pipe, one cast steel trunnion bearing, one cast bronze outer collar, one cast steel inner collar, and two forged steel pipe bands (Circular 254).

## ◀ WASHINGTON DIST. ▶

**Chemical Warfare Service**, Edgewood Arsenal, Edgewood, Md., asks bids until June 2 for one belt conveyer (Circular 166); until June 3, one crawler type tractor and road builder, one roller and one shovel boom, one concrete mixer (Circular 167); until June 4, 700 gross brass clinch tips and 200,000 3/4-in. brass web strap buckles (Circular 173).

**Adolf Gobel, Inc.**, Benning, D. C., meat packer, has let general contract to Turner Construction Co., First and C Streets, N.W., Washington, for plant extensions and improvements. Cost close to \$100,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer. Main offices of company are at Brooklyn, N. Y.

**Chief, Bureau of Yards and Docks**, Navy Department, Washington, asks bids until June 2 for three 600-ft. steel radio towers for high power station at Annapolis, Md., and for alterations in three existing radio towers, same height at same place (Specifications 8155).

**Purchasing and Contracting Officer**, Holabird Quartermaster Depot, Baltimore, asks bids until May 28 for bending brakes, mandrels, bench plates, forming rolls, slitting shears and squaring shears (Proposal 398-149), 12 brake drum lathes, 11 brake shoe grinders, 46 brake shoe reliners (Proposal 398-152); until May 29, one 300-gal.-per-min. centrifugal fire pump (Proposal 398-151); until June 2, 46 universal type motor testers (Proposal 398-155).

**Locke Insulator Corp.**, Charles and Cromwell Streets, Baltimore, has let general contract to C. W. Schmidt, Munsey Building, for one-story addition for expansion in bushing and casting division. Cost over \$125,000 with equipment. Taylor & Fisher, 1012 North Charles Street, are architects; Henry Massart, 328 North Charles Street, is engineer.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until May 25 for one motor-driven air compressor (Schedule 713) for Anacostia Naval Station, one motor-driven engine lathe without motor (Schedule 726) for Eastern yard; two jib cranes (Schedule 729) for Washington yard; until May 28, one motor-driven tool lathe (Schedule 699), one motor-driven grinding machine (Schedule 697), airplane hoisting winches (Sched-

ule 724); until June 1, one motor-driven toolmaker's lathe (Schedule 724), safety boiler valves, spare parts, tools and wrenches (Schedule 725), two 20,000 lb. each and one 10,000 lb. weighing scales (Schedule 731), 49,930 lb. galvanized steel expanded metal (Schedule 742) for Eastern and Western yards.

### ◀ SOUTH CENTRAL ▶

**Taylor Distilling Co.**, Frankfort, Ky., plans several one-story units for expansion in production and storage and distributing building. Cost over \$75,000 with equipment.

**Santa Lucia Wineries, Inc.**, Fresno, Cal., has acquired property at Montgomery, Ala., for one-story branch mechanical-bottling works. Cost over \$35,000 with equipment. Company is affiliated with Roma Wine Co., Lodi, Cal.

**Southern Cotton Oil Co.**, 1315 Williams Street, Memphis, Tenn., plans two one-story additions, with one unit for a machine shop, also improvements in present plant. Cost over \$40,000 with equipment.

### ◀ SOUTHWEST ▶

**General Atlas Carbon Co.**, 60 Wall Street, New York, manufacturer of special chemical-carbon products, a subsidiary of Cities Service Co., plans new works near Guymon, Okla., where site has been selected. It will comprise several units, with compressor installation for processing about 5,000,000 cu. ft. of natural gas per day, boiler plant, machine shop and other mechanical departments. Cost over \$100,000 with equipment.

**Wichita All-Steel Products Co.**, 801-5 South Wichita Avenue, Wichita, Kan., has plans for one-story addition, 60 x 133 ft. Cost close to \$35,000 with equipment.

**Benjamin Moore & Co.**, 1630 South Second Street, St. Louis, manufacturers of paints, varnishes, oils, etc., will take bids on general contract at once for one and two-story and basement addition, 61 x 70 ft. Cost over \$40,000 with equipment. Mauran, Russell & Crowell, Chemical Building, are architects.

**National Refining Co.**, Thirtieth Street and Southwest Boulevard, Kansas City, Mo., oil products, has let general contract to E. L. Winn Construction Co., Railway Exchange Building, for two-story and basement addition to bulk oil storage and distributing plant, 40 x 100 ft., with one-story service, repair and garage adjoining, 50 x 87 ft., for company trucks and cars. Cost about \$60,000 with equipment.

**Pure Oil Co.**, 35 East Wacker Drive, Chicago, plans expansion and improvements in oil refinery at Port Neches, Tex., for increase in crude oil-handling capacity. Extensions will be made also in steel tank storage and distributing division. Entire project will cost close to \$2,100,000 with machinery. Company is arranging for like expansion in gasoline refinery at Muskogee, Okla., including new buildings and high-pressure cracking machinery and auxiliary equipment. Cost about \$650,000 with equipment. Work on both projects is scheduled to begin soon.

### ◀ WESTERN PA. DIST. ▶

**Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has approved plans for further extensions in branch plant at Sharon, Pa., in addition to three-story unit recently referred to. New structures will consist of a one-story building, 100 x 450 ft., and four-story unit, for storage and distribution, and general operating and office service, in order noted. Cost about \$400,000 with equipment.

**Pittsburgh-Corning Corp.**, Pittsburgh, care of Pittsburgh Plate Glass Co., Grant Building, recently organized as a joint interest of last noted company and Corning Glass Works, Corning, N. Y., has acquired large tract at Port Allegany, Pa., for plant for manufacture of structural glass building blocks and similar structural units. It will comprise main one-story building with several smaller units, totaling about 100,000 sq. ft. of floor space, with power house, machine shop and other mechanical departments. Work is scheduled to begin at once. Cost over \$60,000 with machinery, which will be of complete automatic character. H. S. Wherrett, head of Pittsburgh Plate Glass Co., is president of new company.

### ◀ OHIO AND INDIANA ▶

**Lunkenheimer Co.**, Beekman, Waverly and Tremont Streets, Cincinnati, manu-

facturer of bronze, iron and steel valves and kindred specialties, has let general contract to Fisher-DeVore Construction Co., 3629 Idlewild Street, for one-story addition, 70 x 175 ft., for expansion in foundry division. Cost over \$75,000 with equipment. Harry Hake, Sr. and Jr., 2400 Gilbert Avenue, are architects.

**H. J. Heinz Co.**, 1062 Progress Street, Pittsburgh, food packer and canner, has let general contract to Lundoff-Bicknell Co., Terminal Tower Building, Cleveland, for new plant at Fremont, Ohio, comprising three main units, three-stories, 50 x 200 ft., for main canning plant, one-story, 80 x 200 ft., for general rig building, and one-story, 250 x 450 ft., for storage and distribution. Cost over \$400,000 with equipment.

**Socony-Vacuum Oil Co.**, 2846 East Thirty-seventh Street, Cleveland, is considering three-story addition to bulk oil storage and distributing plant. Cost close to \$150,000 with equipment.

**Contracting Officer**, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until May 25 for two bomb rack assemblies (Circular 737), oxygen cylinder bracket assemblies (Circular 741), gun synchronizer generator assemblies in lots of 12 to 30, and six gun synchronizer adapter assemblies (Circular 743); until May 27, one shaper, one sander, one planer and jointer, two band saws, two surfacers, one rip saw, two cut-off saws, one mortiser, two tenoners, and two jib and scroll saws, all motor-driven (Circular 700); until June 1, three oil pumps for hydraulic mechanisms (Circular 738), two aircraft balancing stands (Circular 708).

**Board of Public Works**, City Hall, Fort Wayne, Ind., asks bids until May 28 for watertube boiler, stoker and auxiliary equipment for municipal electric power plant. Cost over \$100,000.

**Board of City Commissioners**, Aviation Department, City Hall, South Bend, Ind., will take bids soon for one-story hangar, 101 x 156 ft., with shop and reconditioning facilities at Bendix Field, near city limits. G. H. Benjamin, 501 West Washington Street, is architect.

### ◀ MIDDLE WEST ▶

**Rapid Roller Co.**, 2558 South Federal Street, Chicago, manufacturer of printers' rollers and equipment, has plans for one-story addition. Cost close to \$40,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

**Metalcraft Corp.**, 361 West Superior Street, Chicago, has leased about 15,000 sq. ft. floor space in building at 1000-20 South Central Park Avenue, for expansion.

**Kraft-Phoenix Cheese Corp.**, 400 Rush Street, Chicago, manufacturer of food products, has let general contract to George A. Fuller Co., 111 West Washington Street, for eight and ten-story plant, 220 x 425 ft. on Peshtigo Court. Cost close to \$2,000,000 with equipment, which will include mechanical-handling, conveying, air-conditioning, refrigerating and other machinery. Mundie, Jensen, Bourke & Havens, 39 South LaSalle Street, are architects.

**Lincoln Steel Works**, 1941 Y Street, Lincoln, Neb., manufacturer of iron and steel products, has let general contract to W. J. Assenmacher & Co., 625 North Seventeenth Street, for two-story and basement plant unit. Cost close to \$100,000 with equipment.

**Bureau of Reclamation**, Custom House, Denver, asks bids until June 3 for one 50-ton motor-operated overhead traveling crane, with 10-ton auxiliary hoist, for Seminole power plant, Casper-Alcova Project, Wyo. (Specifications 929-D).

**Klauser Mfg. Co.**, Ninth and Washington Streets, Dubuque, Iowa, manufacturer of castings, sheet metal stampings, etc., has let general contract to R. F. Conlon Sons Construction Co., Federal Bank Building, for two-story L-shaped addition, in part for storage and distributing. Cost close to \$45,000 with equipment.

**H. J. Sanders Brass Fitting Co.**, 27 South Desplaines Street, Chicago, manufacturer of lamp parts and other brass specialties, has leased two floors in building at 616 West Adams Street for expansion.

**Allis-Chalmers Mfg. Co.**, Milwaukee, has acquired plant site adjacent to its plow works and tractor implement factory at La Crosse, Wis., for further expansion of this production center, enlarged in 1936 at cost of \$750,000. Contemplated expenditure has not been announced. Fred J. Papenfuss is works manager at La Crosse.

**Jacobsen Mfg. Co.**, 747 Washington Ave-

nue, Racine, Wis., manufacturing power lawn mowers, has purchased a four-story section, 60 ft. sq., of old H. & M. Body Corp. factory on Center Street, now being wrecked, and will install equipment at once.

**Ameco Metal, Inc.**, 3830 West Burnham Street, Milwaukee, has broken ground for foundry and machine shop extension, 80 x 200 ft., costing about \$75,000 with new equipment. Company specializes in alloy brass and bronze products.

**International Harvester Co.**, Milwaukee Works, 1714 West Bruce Street, Milwaukee, has plans by company engineer, Otto Krueger, Chicago, for foundry addition, 25 x 70 ft.

### ◀ MICHIGAN DISTRICT ▶

**Michigan Wineries, Inc.**, Detroit, has plans for one-story addition, primarily for storage and distribution. Cost about \$40,000 with equipment. O'Dell & Rowland, Marquette Building, are architects.

**Gar Wood Industries, Inc.**, 7924 Riopelle Street, Detroit, manufacturer of oil burners, air-conditioning apparatus, hoists, etc., has purchased about 4½-acre tract at North Avenue and Meadow Street, Elizabeth, N. J., for new Eastern branch plant. Initial unit will be one-story, primarily for assembling of air-conditioning equipment and oil burners. Cost over \$75,000 with equipment. Additional units will be built later.

**Masco Screw Products Co.**, 2700 Franklin Street, Detroit, is arranging for a stock issue to total about \$88,500, part of proceeds to be used for purchase of additional machinery.

**Kalamazoo Paper Co.**, Kalamazoo, Mich., manufacturer of book and writing papers, has let general contract to Miller-Davis Co., Kalamazoo, for one-story addition. Cost over \$40,000 with equipment.

### ◀ PACIFIC COAST ▶

**Snyder Foundry Supply Co.**, 2435 East Fifty-eighth Street, Los Angeles, has asked bids on general contract for one-story addition, primarily for storage and distribution. Cost about \$35,000 with equipment. W. M. Bostock, 6221 Pacific Boulevard, Huntington Park, Cal., is engineer.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until May 25 for one motor-driven upright drill (Schedule 708) for Mare Island Navy Yard; until May 28, one gasoline engine-driven electric generator and accessories (Schedule 701), parts for airplanes (Schedule 800-826) for San Diego Naval Air Station; until June 4, one controlled atmosphere type electric furnace and accessory equipment, with transformer, cutouts, conductor cable, etc. (Schedule 732), for Puget Sound yard.

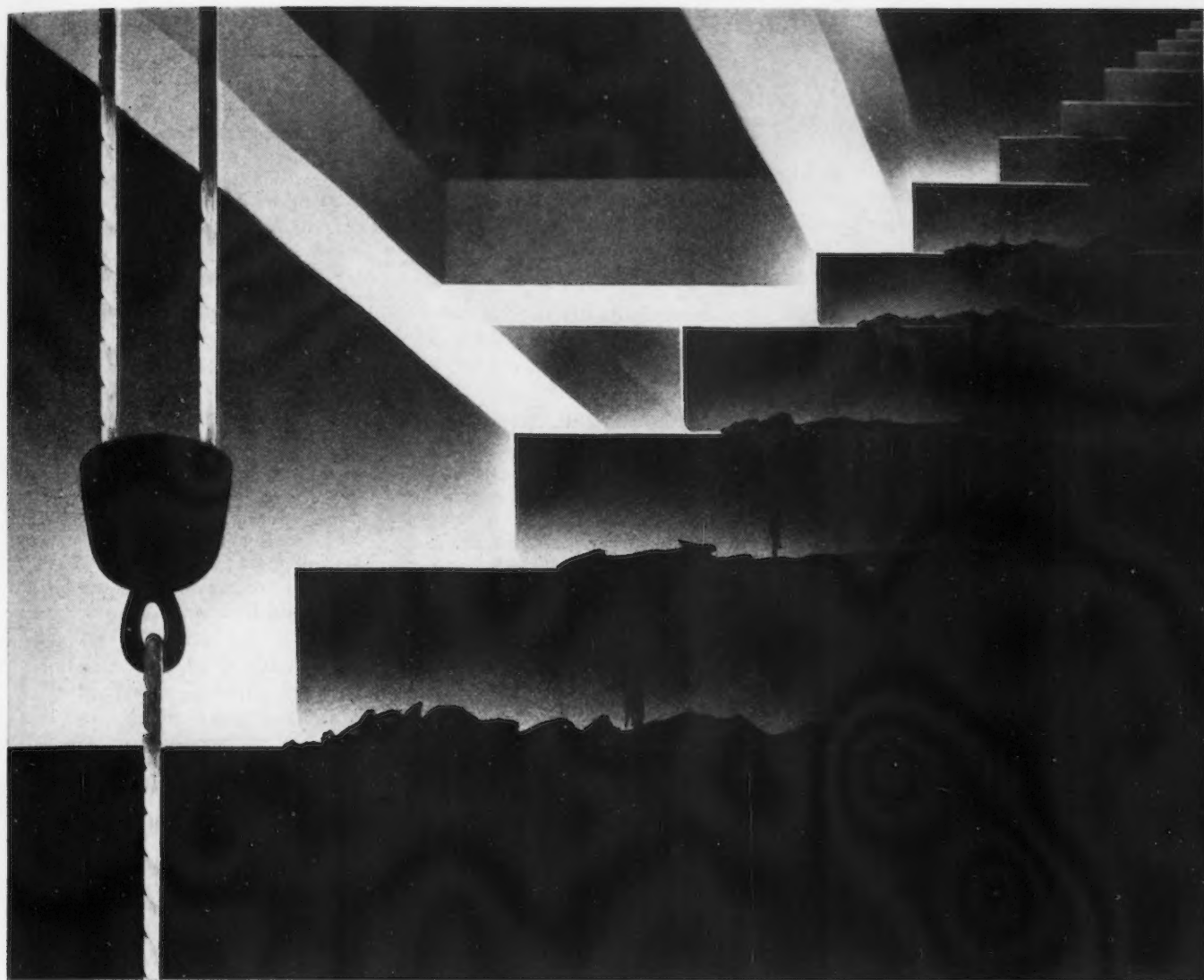
**Libby, McNeill & Libby**, S.E. Twenty-second and Lafayette Streets, Portland, food packer and canner, has plans for two one-story additions, 122 x 165 ft., and 138 x 165 ft., first noted for expansion in main canning plant and latter structure for storage and distribution. Cost close to \$100,000 with equipment. Ertz-Burns Co., Pittock Block, is architect.

**Bureau of Reclamation**, Custom House, Denver, asks bids until May 27 for 12 12,000-lb. single-drum radial-gate hoists for installation in sluiceway structure, and 14 20,000-lb. double-drum radial-gate hoists for installation in influent and by-pass channels of desilting works, Imperial Dam, All-American Canal System, Boulder Canyon project (Specifications 927-D); until June 3, trash-rack metalwork for outlet works at Grand Coulee Dam, Columbia Basin project, Wash. (Specifications 739).

**City Council**, Seward, Alaska, asks bids until June 7 for municipal electric power plant, using Diesel engine-generator units and auxiliary equipment. Cost about \$90,000. Appropriation has been arranged in that amount.

### ◀ FOREIGN ▶

**American Metal Co.**, 61 Broadway, and Newmont Mining Corp., 14 Wall Street, both New York, operating South Africa Copper Co., Johannesburg, South Africa, as a joint interest, have acquired former O'Kiep copper mining properties in Namaqualand, South Africa, and plan extensive development. A new smelting plant is being considered to handle about 1500 tons of ore per day. Entire project will cost over \$1,500,000. Project will be carried out in name of South Africa Copper Co.



## Maintenance saved is money earned

EVEN in products or equipment in which maintenance involves merely routine repairs, the use of Molybdenum steels can effect worth-while economies. But when maintenance also involves the cost of new parts, replacement labor, service interruptions, time and profit losses, the infinitely greater wearing qualities of Moly steels mean savings too substantial to be overlooked.

One of many actual instances proving the capacity of Moly steels to withstand rough service over long periods, is found in the lift-chain bushings of sand diggers. Chrome-Moly steel bushings replaced the former kind. Although subjected to terrific battering and continuous service, their records showed a decided increase in life and, consequently, a decrease in service interruptions and maintenance costs.

*Under virtually every kind of operating condition, Moly steels and irons will prove their economy through greater strength and longer wear. Investigate. Send for our technical book, "Molybdenum." Ask us to mail you our monthly news-sheet, "The Moly Matrix." Consult our laboratory on your difficult ferrous problems. Climax Molybdenum Co., 500 Fifth Ave., New York.*

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

**Climax Mo-lyb-den-um Company**  
**MOLY**

# Building a Fleet

(CONTINUED FROM PAGE 31)

sued. This sometimes holds up a very necessary plan for considerable time, pending the working up of the changes. Sometimes, the work is wholly or partly done before the hold-up is received, necessitating tearing down and rebuilding. In welded construction, one apparently unimportant hold-up may seriously affect a large amount of related work. These hold-ups sometimes interfere with the maintenance of a balanced working force and thus affect the morale of the employees. Good morale among the people executing the plans is an indispensable ingredient in the construction of good ships.

As may well be imagined, the Central Drafting Office is no bed of roses. When plans are not on hand, the Navy Yards are prone to blame the C.D.O. When material is required, but no contract has yet been let, the C.D.O. is usually the goat. But, the C.D.O. must first obtain the plans from the contract designer and must often obtain approval from busy or undecided bureaus. It cannot obtain material and equipment as expeditiously as the private contractor, because Government-contract laws result in an inflexible and drawn-out system of purchasing. Considering the number and types of ships this office must handle, and the complexity and number of plans for each type, the C.D.O. is performing a difficult job well.

The first plans received by the building yard are the lines and offsets. From these, the body plan,

the stern and other strongly curved parts of the ship are drawn out full-scale on the mold-loft floor and accurately faired. Loftsmen then make wooden and paper templates of nearly everything that goes into the structure of the ship and send them to the fabricating shops.

## Fabrication

The shops cut their material, roll, drill, punch and machine it according to the templates. Small sub-assemblies are made in the shops; the governing factors being space and weight handling considerations. Tailored and assembled pieces are sent to the building ways, where the erection gang incorporates them into the hull structure. Erection is not simply putting up the stuff received from the shops. Careful thought must be given to the order of work, so that when the ship is built it will not be necessary to cut it apart again to put in a large and forgotten piece. Furthermore, plans are not always perfect. Sometimes, the electricians beat the pipefitters to the only available space and room must be found for both. Then again, the welding must be considered. If the sequence is wrong, the vessel may acquire a serpentine appearance, or look like a seagoing washboard, or end up as much as a foot short. Shrinkage caused by welding is an ever present nightmare.

In erecting the ship, the reference planes are frames, waterlines, and buttocks. All dimensions are referred to these planes. Transits,

levels, trams and strings are used to project and extend these planes so that the structure is fastened exactly in the place fixed by the designer. If regulation of the ship structure is not very accurate, there will be loss of fabricated material and complications in assembling machinery and equipment. Every building yard eventually finds itself between the devil (plans and contract price) and the deep sea (fitting-out personnel). The prospective operating personnel begins to arrive some months before commissioning. Immediately, the Construction Superintendent begins to receive suggestions for improving on the work of the designers. Sometimes, these suggestions are worth while, but always they cost money, and usually they involve departures from the plans. Steering a diplomatic course in these troubled waters is a feat in itself.

But all the planning, all the scheming and all the executive brilliance of the top strata in the hierarchy of ship-building would be wasted unless supported by a competent corps of mechanics capable of translating paper plans into steel ships. The calibre of the work performed by the men who wield the tools is the basic foundation upon which the excellence of a fleet must be built. Our country is the fortunate possessor of a patriotic and able body of artisans, supervisors and technicians who know shipbuilding as only years of conscientious craftsmanship can teach it. When our chests swell with pride as our splendid new fleet passes in review, we should look beyond the parade of uniforms and give a thought to the capable, but unsung, army of civilians who gave it being.



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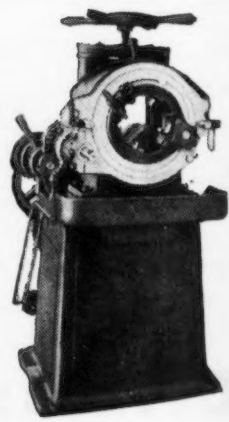
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